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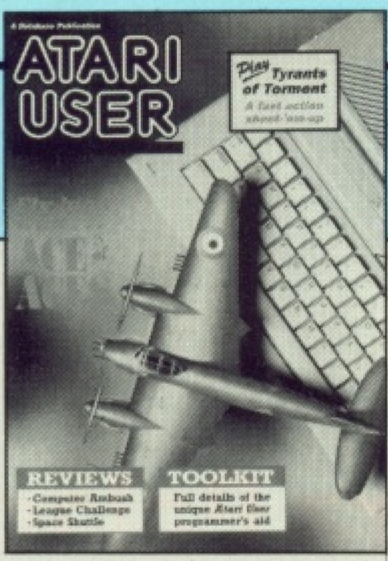
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Contents

Get it right! II

All major listings in this issue are accompanied by checksums to help overcome typing mistakes. For full details of how they work, see the article on page 23 of the November 1987 issue of *Atari User.*



Add TEN new commands to Atari Basic with this latest package from Atari User.

SEE PAGE 42

ATARI USER NEWS REVIEW

'More to the Atari than just games'

THE capabilities of the Atari 8 bit micro are not being fully utilised, according to Keith Mason, general manager of Software Express.

"Serious programs such as word processors, spreadsheets, databases and programming languages are being overlooked in favour of cheap cartridge and cassette-based games", he said.

"We have no problems selling budget titles, but when it comes to anything over £10 it would appear that there is a no go area for 8 bit users.

"It's a great pity because the machine is more than capable of handling serious applications".

Software Express (021-328 3585) produces a number of packages for the Atari such as the Xlent word processor for £29.95, the FynCalc spreadsheet at £49.95 and the FynFile database also at £49.95.

"Even though the prices are relatively cheap compared to other full function programs, sales are very low indeed", said Keith.

"The problem may be that many newcomers to the Atari just don't know that it is more than a games machine.

"If they could only look beyond the joystick they would get a lot more out of their micro".

ON THE SERIOUS SIDE . . .

ATARI users who want more than entertainment from their machines have a new source of serious software.

Valar Software has just completed development of a desktop publishing and circuit board CAD program for Atari 8 bit machines, and wants to hear from prospective users.

Richard Prangnell of Valar (0273 417370) told Atari User: *"We believe the aspirations of the average 8 bit user extend further than games.*

"I am sure a lot of Atari owners are interested in getting more from their machine and we would like to hear from them.

"If the response is good enough then we will set up a creative user group".

Fresh from the USA

THE range of acclaimed Atari 8 bit programming aids from American company OSS is to be made available in the UK.

Frontier Software (0423 67140) is importing them in its role as distributor for ICD Inc of Illinois, which recently took over OSS's product line.

An alternative to Basic, the fast programming language Action! blends the best elements of Pascal and C. It is available on cartridge for £49.95, and toolkit disc for £19.95.

Macro assembler and editor Mac/65, for serious assembly language programmers, includes the powerful DDT screen-oriented debugging program. The cartridge costs £49.95 and the toolkit disc £19.95.

Downward compatible with standard Atari Basic but with an additional 45 commands, Basic XL supports all Atari 8 bit micros. The cartridge is £39.95 and the toolkit disc £19.95.

Basic XE has all the commands and is designed for the Atari 130XE to make better use of the memory but still retain compatibility with Atari Basic. The cartridge costs £49.95.

ATARI Corporation's computer activities continue to prosper. The company has just reported net sales of $147.5 million for the last quarter – up 59 per cent from the previous year's $92.6 million.

Income was 53 per cent up at $31.3 million. This means net sales for the year stand at a record $363.8 million – a rise of 41 per cent over the previous year. Income was up 49 per cent at $72 million.

Atari President Sam Tramiel said: "The computer segment of our business continued to grow at a record pace, contributing over 51 per cent of our net sales for the year".

Pirates are under fire

ATARI has been showing Far East software pirates that it means business.

The company has obtained court injunctions against six Singapore firms alleged to have infringed its copyright and design patents.

The move follows the recent inclusion of computer software under Singapore copyright laws.

Atari has also seized a large consignment of games cartridges originating in Taiwan and destined for European markets.

New games group formed

A MAJOR international publisher has joined forces with a new software house to launch an exclusive entertainments label for the Atari.

Mandarin combines the marketing muscle of the Europress Group, parent company of Database Publications, in a series of joint ventures with some of the UK's top programming teams.

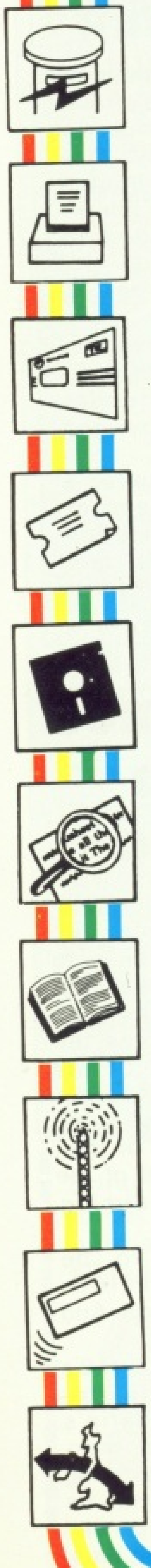
The first title to be released by Mandarin is an adventure trilogy, Time And Magik, from Level 9.

"We believe that Level 9's programming skills, together with Mandarin's knowledge of the marketplace, abilities in printing and packaging, and its understanding of the need to get products out on time, will be an unbeatable com-

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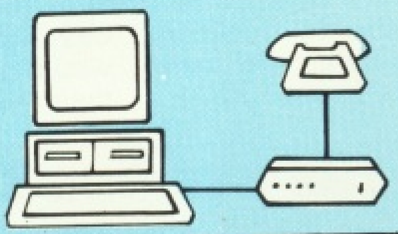
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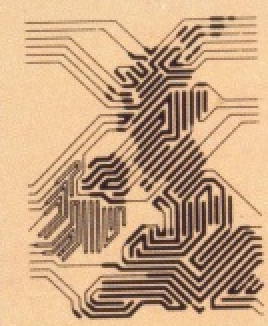
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ATARI USER NEWS REVIEW

Show's the place for big savings

EXHIBITORS are forecasting record savings on hardware and software at this month's Atari User Show.

It takes place April 22 to 24 at Alexandra Palace, London, and a survey conducted by *Atari User* reveals that potential savings to visitors should total well in excess of £100,000.

The event will also be the launching pad for a number of exciting new Atari 8 bit products.

Red Rat Software will be unveiling its latest bargain price compilation games packs, which include the popular titles Mad Jax, Dreadnought, and Space Wars.

Seen at the show for the first time will be the new quality games publisher Mandarin Software. The company has produced an excellent adventure for the Atari 8 bit – Time and Magik.

The move to the larger exhibition space provided by Alexandra Palace further emphasises the increasing popularity of products on the Atari.

Previous venues have proved too small for the ever increasing numbers of exhibitors and visitors.

One of the many special attractions to be seen in the West Hall will be the games arcade. A large bank of machines will be available for playing the very latest titles from leading software houses.

Centre stage at the show will be leading Atari dealer Silica Distribution with a massive 66 square metre stand.

It will be displaying the UK's largest ever range of software and hardware at the show. The company is also offering free registration to its Atari user groups.

No Star Wars

ATARI User has received many letters pleading for a version of the top-selling game Star Wars.

Despite interest shown by *Atari User* readers, Domark says it will not be releasing an Atari 8 bit version.

◄ From Page 5

bination", says Pete Austin of Level 9.

Mandarin's involvement with the innovative games software house is the first of a series of joint ventures.

"We find ourselves in the position that, unlike many other publishers, we don't have to rush out titles to maintain cash flow", says Chris Payne, spokesman for the new venture.

"Mandarin couldn't be more sound financially – we have £1 million in the kitty – so we are in a superb position to be able to pick and choose not only our partners, but also just what products we decide to release. It is our aim that our label will become synonymous with quality, providing the Rolls Royce of software games for the Atari. And what better way to start than with Level 9?".

The first game to be released, Time And Magik, has up to 60,000 words of text, 700 locations and a 10,000 word book containing detailed play guide and short story.

To help players who get bogged down with the intricacies of the game, Level 9 is providing comprehensive clue sheets free of charge. The game costs £14.95 on tape or disc.

THE GALLUP CHART TOP 20 ATARI SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	●	LEAGUE CHALLENGE *Atlantis*	1.99
2	▲ 8	PANTHER *Mastertronic*	1.99
3	▲ 12	POLE POSITION *Atari*	12.99
4	●	FEUD *Mastertronic*	1.99
5	▲ 13	DECATHLON *Firebird*	1.99
6	▼ 1	HENRY'S HOUSE *Mastertronic*	1.99
7	▼ 4	TRANSMUTER *Code Masters*	1.99
8	▲ 14	SPACE SHUTTLE *Firebird*	1.99
9	●	SPEED ACE *Zeppelin*	2.99
10	▲ 19	ON CUE *Mastertronic*	2.99
11	▼ 3	180 *Mastertronic*	2.99
12	▲ 17	BMX SIMULATOR *Code Masters*	1.99
13	●	PLATFORM PERFECTION *US Gold*	9.95
14	●	GHOSTBUSTERS *Ricochet*	1.99
15	●	SOCCER *Alternative*	1.99
16	●	MILK RACE *Mastertronic*	2.99
17	▼ 7	STORM *Mastertronic*	1.99
18	●	COLONY *Mastertronic*	1.99
19	▼ 6	DIZZY DICE *Players*	1.99
20	▼ 10	RIVER RAID *Firebird*	1.99

Compiled by Gallup/Microscope

New from Atlantis is League Challenge which goes straight to the number one spot. You can read the review in this issue.

The only full-priced title in the Top Ten this month is Pole Position from Atari, yet there are seven new entries and re-entries, including a new title from US Gold – Platform Perfection.

LET'S TRY TACKLING TOKENISING

ANDRÉ WILLEY continues his in-depth examination of the way Atari Basic is structured

HAVE you by now managed to digest last month's somewhat technical delve into the inner secrets of Atari Basic? It's not really as complex as it first seems, is it? This time we'll be continuing from where we left off and taking a look at the way program lines are encoded – or tokenised.

Looking back for a moment you will remember the example program we were using last time:

```
5 LET NUMBER=120
10 PRINT NUMBER
```

Line 5 tokenised to give us the codes *5, 0, 15, 15, 6, 128, 45, 14, 65, 18, 0, 0, 0, 0, 22* and line 10 gave us the somewhat shorter sequence *10, 0, 7, 7, 32, 128, 22*.

As a quick reminder, the first two digits of each line represent the line number in standard 6502 low high format and the next two give us the total number of bytes contained in the tokenised line. The final 22 is a marker to tell Basic it has reached the end of the current line.

All the bytes in between represent the program lines themselves, with numbers of 128 and over referring to variables – as stored by Basic in the variable name table. These tokenised lines will be used whenever you run the program, and are only ever converted back into text form when you decide to use LIST.

This time we'll be considering a slightly more complex program – shown as Listing I with the tokenised version in Figure I. It contains a number of features we haven't looked at yet, the most important being strings and multi-statement lines.

The first thing to note is that there are four variables in the program – *TEXT$, A, B* and *C*. These are given the first four variable name tokens, so *TEXT$* is referred to by the number 128, *A* by 129, *B* by 130 and finally *C* by 131.

This is, of course, the order in which the variables were first referred to when the program was typed into memory.

```
10 DIM TEXT$(20)
20 TEXT$="HELLO"
30 PRINT A: PRINT B: PRINT C
40 REM THE END
```

Listing I: Simple example program

Line 10 is easy to work out and differs little from the lines we have seen before. The token 20 refers to the word DIM, and 59 and 44 are the open and close bracket symbols. As we have already seen, *TEXT$* is given the token 128, and the number 20 is coded somewhat lengthily as a numeric constant in binary coded decimal. See last month's article for more information on BCD coding.

Line 20 contains something completely new – the string assignment **TEXT$="HELLO"**. Once tokenised, it looks like this:

20 0 15 15 54 128 46 15 5 72 69 76 76 79 22

You should know by now that the first four numbers – 20, 0, 15 and 15 – mean that the line number is 20 and it is 15 bytes long. But the rest of the codes are new.

Firstly, the token 54 means LET – because what we meant to type was **LET TEXT$="HELLO"**, even if we omitted the word itself.

This use of token 54 is referred to as an implied LET – if we typed in the full version of the line all that would change would be that the 54 would be replaced by a 6, the normal token for LET.

The digit 128 tells Basic we want to use the first variable (*TEXT$*), and 46 represents the equals sign. The number 15 signifies the start of a string constant in much the same way as the number 14 always precedes a BCD numeric constant.

The string is coded very simply as a single byte to indicate the length of the string – in this case five characters – and then the text in standard Ascii form. Finally the line is terminated with the normal 22.

Line 30 gets a little more complex since it contains three different statements, each separated by a colon. This line tokenises to:

30 0 15 7 32 129 20 11 32 130 20 15 32 131 22

which in turn breaks down into these four segments:

30	0	15	
7	32	129	20
11	32	130	20
15	32	131	22

The first part is simple enough to decipher, since we've seen its form a number of times before. The 30 and the 0 give the line number (30) and the 15 gives us the total number of bytes in the tokenised line – count them and see. We also already know that 32 is the standard token for PRINT and that the numbers 129, 130 and 131 are simple variable references.

The token 22 signifies the end of the

10 0 16 16 20 128 59 14 64 32 0 0 0 0 44 22	10 DIM TEXT$(20)
20 0 15 15 54 128 46 15 5 72 69 76 76 79 22	20 TEXT$="HELLO"
30 0 15 7 32 129 20 11 32 130 20 15 32 131 22	30 PRINT A: PRINT B: PRINT C
40 0 13 13 0 84 72 69 32 69 78 68 155	40 REM THE END

Figure I: The tokenised structure of Listing I

Turn to Page 10 ▶

◀ *From Page 10*

line, so it's not too difficult to see that 20 must indicate the end of a statement within a multi-statement line – rather like the colon in the original text version. This just leaves us with the numbers 7, 11 and 15 at the start of each successive statement to explain.

In the same way that Basic stores the total length of the line, so it must also keep track of the length of each statement within that line.

So far we have seen only a single statement on a given line, so we see two identical length values – the distance to the end of the line being the same as that to the end of the first (and only) statement.

However, in this case we see that the second length byte in fact refers to the length of just the first statement. To be more accurate, it provides an offset to the beginning of the next statement.

The value of 7 in the tokenised version of **PRINT A** gives the total number of bytes that must be counted to take you from the start of the line to the last byte of that first segment – the very next byte will be the start of the following statement.

Similarly the number 11 at the start of the second statement tells us that the third statement will begin 12 bytes in from the start of the line – since the second one finishes at byte 11.

Finally the last statement on a line will always contain the same offset value as the total line length byte – the offset to the next statement being the same as the offset to the next line. This is why the special cases we have looked at so far – in which there is only one statement on a line – always have the same number for the line offset as they do for the statement offset.

The last line of our sample program is probably the simplest of them all. After the line number and the two identical length bytes comes the single token zero meaning REM. This is followed by the rest of the Ascii text – terminated in this case with a carriage return byte (155) instead of the normal code 22. This is done so that you are able to use a Control+X – Ascii code of 22 – in your text.

A DATA statement would be coded in exactly the same way, but with a token value of 1 followed by the Ascii text.

It would obviously take far too long to give examples of all the individual tokens used by Atari Basic, but you should by now understand the general format of a line.

For further information Figures II, III and IV give a complete breakdown of all the available tokens and their meanings. The first token of any statement will always come from Figure II, and it may be followed by either some Ascii text – such as in the case of REM, DATA or ERROR lines – or more normally by a mixture of the tokens listed in Figures III and IV plus various numeric or string constants.

You will notice from the list of arithmetic and string operations given in Figure III that some characters seem to have more than one possible token. This is especially notable in the case of the open bracket and the equals signs, and is due to the fact that they can be used in a variety of functionally quite different situations.

For example, the equals symbol may be used to assign a value to a numeric variable – as in **LET A=10**, or to a string – with **LET TEXT$="HELLO"**. It can also be used for comparison of either strings or numbers – such as **IF TEXT$="N" THEN END** or **IF A=MAX THEN 100**.

Similarly the open brackets character can be used within a mathematical formula to access a substring, inside a DIM statement or as part of a function call such as **PRINT CHR$(A)**.

Each usage of the character has its own unique token, and these various special cases are listed alongside each token.

One other point of interest concerns the useful trick of abbreviating commands when you are typing in a program. I've no doubt that many of you prefer to use GR. instead of the much longer GRAPHICS, or L. instead of LIST. But how does Basic know that typing S. means SAVE rather than SOUND or even SETCOLOR?

The answer lies in the structure of Figure II. When Basic discovers a dot within a command, it scans through the table starting at the top, until it finds a match for the few characters it has been given. Thus, since SAVE comes before any other word starting with S, this becomes the first match and the command is read as SAVE.

If you just type the dot without any other characters the match will be made on the very first token in the table – giving you a very quick way to enter REMs.

This technique works with any command, but not with functions. Thus there is no way to shorten PADDLE, for example, because it is a function call, as listed in Figure IV. Also some abbreviations have dubious advantages – such as POK. instead of POKE. It can't be shortened any further because using P. or even PO. would result in the command POINT being generated.

Unfortunately we are stuck with the command table order as defined by Atari in the Basic rom.

● *Next month I'll conclude this tour of Basic's inner workings with a program which will enable you to see these tokens in action for yourself.*

Token	Basic keyword	Token	Basic keyword
0 ($00)	REM (followed by text terminated with a Carriage Return)	28 ($1C)	POINT
1 ($01)	DATA (as for REM)	29 ($1D)	XIO
2 ($02)	INPUT	30 ($1E)	ON
3 ($03)	COLOR	31 ($1F)	POKE
4 ($04)	LIST	32 ($20)	PRINT
5 ($05)	ENTER	33 ($21)	RAD
6 ($06)	LET	34 ($22)	READ
7 ($07)	IF	35 ($23)	RESTORE
8 ($08)	FOR	36 ($24)	RETURN
9 ($09)	NEXT	37 ($25)	RUN
10 ($0A)	GOTO	38 ($26)	STOP
11 ($0B)	GO TO (same as GOTO)	39 ($27)	POP
12 ($0C)	GOSUB	40 ($28)	? (same as PRINT)
13 ($0D)	TRAP	41 ($29)	GET
14 ($0E)	BYE	42 ($2A)	PUT
15 ($0F)	CONT	43 ($2B)	GRAPHICS
16 ($10)	COM (same as DIM)	44 ($2C)	PLOT
17 ($11)	CLOSE	45 ($2D)	POSITION
18 ($12)	CLR	46 ($2E)	DOS
19 ($13)	DEG	47 ($2F)	DRAWTO
20 ($14)	DIM	48 ($30)	SETCOLOR
21 ($15)	END	49 ($31)	LOCATE
22 ($16)	NEW	50 ($32)	SOUND
23 ($17)	OPEN	51 ($33)	LPRINT
24 ($18)	LOAD	52 ($34)	CSAVE
25 ($19)	SAVE	53 ($35)	CLOAD
26 ($1A)	STATUS	54 ($36)	(implied LET)
27 ($1B)	NOTE	55 ($37)	*ERROR (followed by the Ascii text and a Carriage Return)

Figure II: Keyword tokens used by Atari Basic (always the first token of a statement)

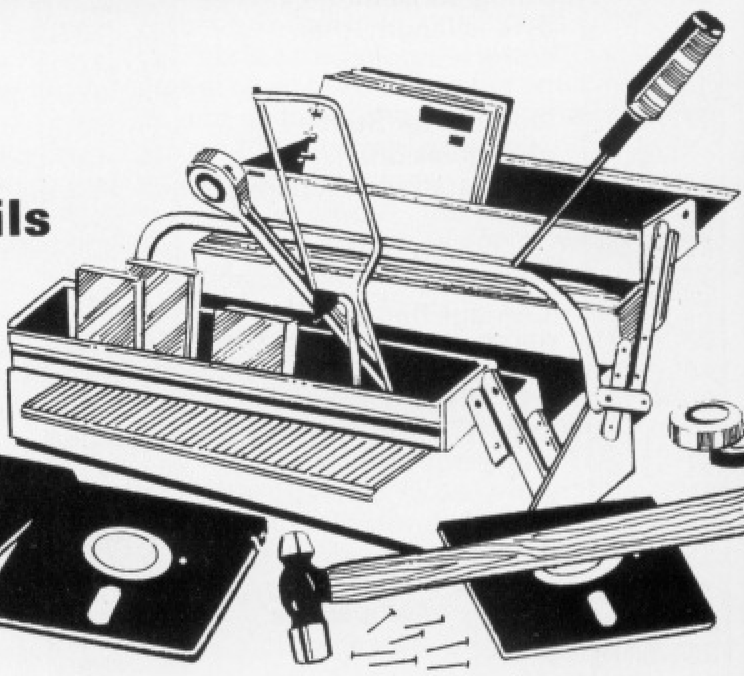
Token	Meaning	Token	Meaning
0-13	Unused	36 ($24)	*
14 ($0E)	Numeric constant (next six bytes hold it's BCD value)	37 ($25)	+
15 ($0F)	String constant (next byte is length, then string contents)	38 ($26)	-
16 ($10)	"	39 ($27)	/
17 ($11)	(dummy for Start of Expression)	40 ($28)	NOT
18 ($12)	, (parameter separator)	41 ($29)	OR
19 ($13)	$	42 ($2A)	AND
20 ($14)	: (end of statement)	43 ($2B)	((within arithmetic expression)
21 ($15)	;	44 ($2C)	)
22 ($16)	(Carriage Return)	45 ($2D)	= (Arithmetic assignment)
23 ($17)	GOTO	46 ($2E)	= (String assignment)
24 ($18)	GOSUB	47 ($2F)	<= (String comparison operators)
25 ($19)	TO	48 ($30)	<> (String comparison operators)
26 ($1A)	STEP	49 ($31)	>= (String comparison operators)
27 ($1B)	THEN	50 ($32)	< (String comparison operators)
28 ($1C)	#	51 ($33)	> (String comparison operators)
29 ($1D)	<= (Arithmetic comparison operators)	52 ($34)	= (String comparison operators)
30 ($1E)	<> (Arithmetic comparison operators)	53 ($35)	+ (unary plus)
31 ($1F)	>= (Arithmetic comparison operators)	54 ($36)	- (unary minus)
32 ($20)	< (Arithmetic comparison operators)	55 ($37)	((for substrings)
33 ($21)	> (Arithmetic comparison operators)	56 ($38)	((for arrays)
34 ($22)	= (Arithmetic comparison operators)	57 ($39)	((in DIM statement)
35 ($23)	↑	58 ($3A)	((for function call, eg: in 'CHR$(...')
		59 ($3B)	(
		60 ($3C)	, (array/substring element separator)

Figure III: Operator tokens used by Atari Basic

Token	Function
61 ($3D)	STR$
62 ($3E)	CHR$
63 ($3F)	USR
64 ($40)	ASC
65 ($41)	VAL
66 ($42)	LEN
67 ($43)	ADR
68 ($44)	ATN
69 ($45)	COS
70 ($46)	PEEK
71 ($47)	SIN
72 ($48)	RND
73 ($49)	FRE
74 ($4A)	EXP
75 ($4B)	LOG
76 ($4C)	CLOG
77 ($4D)	SQR
78 ($4E)	SGN
79 ($4F)	ABS
80 ($50)	INT
81 ($51)	PADDLE
82 ($52)	STICK
83 ($53)	PTRIG
84 ($54)	STRIG
85-127	Unused
128-255	Reserved for variables

Figure IV: Function tokens used by Atari Basic

Give us the tools and...



MICK RANDLE gives full details of the Atari User Programmer's Toolkit

Atari XE computers are arguably the best 8 bit home micros available and are certainly the best value for money. Even the ST range is inferior to the XE in some ways – just ask a machine code programmer.

It is amazing that the internal design of the XE has remained virtually unchanged since 1979, when the first Atari 400 was introduced. Unfortunately, some areas of its performance do tend to betray its ancient origins. For example, Atari Basic is notably lacking when compared to other versions of the language used by other computers.

Being an inventive lot, Atari enthusiasts frequently write utility programs to make up for Basic's deficiencies, and lots have been published in *Atari User*. The snag is that although each admirably fulfills a requirement, it normally has to be loaded into memory as it is required. This means that it can take programmers a relatively long time to perform straightforward tasks.

The problem is not that Atari Basic is a bad language – it is more a case of it being incomplete. Even essential program development commands like line renumbering and deletion are conspicuous by their absence. True, you can go out and buy alternative versions of Basic but they cost nearly as much as the computer itself, and you run the risk of your programs being incompatible with standard machines.

What we need is an extended Atari Basic which is compatible with the standard one, but with additional program development functions. We want the functions to execute quickly, with the minimum of typing and without having to remember complicated commands. We also have to retain as much memory as possible because a large Basic language is not much use if there is not enough memory left for a program.

THE Atari User Toolkit offers 10 additional Basic commands and is totally compatible with standard Atari Basic. It consumes only 128 bytes of user memory and it even leaves Page 6 – memory addresses 1536 to 1791 – free.

All the Toolkit commands are useful and are easy to remember and use and several, like line renumbering, can be found in other computers as built-in utilities. But some of the new commands are exclusive to the Atari community.

Toolkit loads into memory via an autoboot file on tape or disc. When it has loaded you can begin your programming session and forget about it until you need it. As previously mentioned, the total cost in terms of user memory is only 128 bytes. This is achieved by placing the main code in the unused ram beneath the Basic rom chip, and switching between the two banks as required.

The code which handles this switching is 128 bytes long and resides in low memory. Figure I explains the computer's memory allocation. Notice that we have effectively squeezed 16k of code into the 8k area from $AOOO to $BFFF.

The Toolkit commands are called from Basic's direct command mode – they execute when you type them rather than during program execution.

Renumbering

You may renumber your program lines from base line 10, in line increments of 10, by typing REN. All line references, such as GOTO 100, are automatically altered to reference the new line number. You can vary the base line and the line increment by entering them after the command, separated by a comma.

Toolkit checks to see if your new line numbers are acceptable before altering your program, so there is no chance of ruining your work. Variable line references, such as GOTO LINE, cannot be renumbered because Toolkit cannot determine how a variable may change.

Similarly, references to non-existent lines cannot be renumbered because they are programming errors. Toolkit continues to renumber the program, displaying alert messages where appropriate.

As an aid to legibility, all non-existent line references are set to 99999 so that you can easily identify the offending statement.

Deleting lines

The line deletion command is an important and long overdue addition to Atari Basic. Just type the DEL command followed by two line numbers separated by commas, and all lines within the specified range will be removed from your program.

The first line number should obviously be lower than the second one, but again if you make a typing error Toolkit will tell you rather than ruin your program. Make sure that the

remainder of your program makes no reference to the missing lines, as no checking is performed by Toolkit.

A good way to find such references is to renumber the program with the REN command, which will expose any references to the now non-existant lines.

Strip utility

The STRIP command is a sort of selective line deletion utility. It deletes all REM statements from the program whether they are short REMs at the end of multiple-statement lines, or full-line REMs.

Their removal makes a routine more difficult to understand, but on the other hand it reduces the size of the program and increases its speed of execution. It has always been good programming practice never to GOTO a REM line, although many programmers do it. Test for such references by using the REN command as above.

Changing variables

Sooner or later every programmer reaches the stage where a variable name is no longer appropriate to its function.

Suppose you are using *X* to represent the number of remaining lives in a game program. As the program grows you decide that *LIVES* would have been a more descriptive name, but you leave it as *X* because you don't feel like altering 36 occurrences of the variable.

The CHANGE command allows you to change the *X* to *LIVES* simply and quickly, and all occurrences of the variable will be altered automatically.

Full checking is performed by Toolkit to prevent you from making a mess of your program by duplicating an existing name, or changing the variable to a different type such as converting a string variable to an array.

Listing variables

You may find that you receive a duplicate name error when using the CHANGE command, and you are not sure exactly what variables you are using. Find out by using LVAR, which not only lists each variable in memory, but also displays every line number it appears in.

Unused variables are indicated and are wasteful of memory, so rather than invent a new one you could change the name of a redundant variable with the CHANGE command.

Removing click

Every time you press a key you will hear the familiar click through the monitor loudspeaker, which can drive many programmers to distraction. A poke can switch it off, but I don't know anyone who can remember either the memory address or the number to POKE in it.

The CLICK command saves you the trouble. The funny thing is that many people actually miss the sound when it has gone, so if you find you want it back just type CLICK again.

Perfect Listing

A major bugbear for Atari users is the fact that the computer is capable of displaying more characters than a printer is capable of printing. The printer interprets many characters as print control codes in a similar way that the computer interprets the Control+Clear combination as a screen control code.

It is no coincidence that the Control Shift key is so-called. That is why you sometimes find that when listing a program with the command LIST "P:", a machine code string may make your printer perform a dozen line feeds and print the rest of your listing in Greek.

Toolkit's LISTING command gives you a full printed listing without any of the above problems on any Epson or Epson-compatible printer with bit-image graphics capability.

Changing bases

Intermediate to advanced programmers often need to convert a decimal number to its hexadecimal or binary equivalent. This usually means a frenzied search for the calculator or a book containing conversion tables.

Not any more. Just type VAL and the decimal number for an immediate

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Operating system rom   *($C000 to $FFFF)*
8k Basic rom and 8k Toolkit ram   *($A000 to $BFFF)*
Screen memory   *(Size varies with graphics mode)*
Free memory for programs   *(Size varies)*
128-byte Toolkit handler   *(address varies with system)*
Operating system and Basic ram   *(Size varies)*

Figure I: How the Atari allocates memory

Command	Example	Purpose
CHANGE old,new	CHANGE X,LIVES	Change variable name
CLICK	CLICK	Toggle key-click
DEL line1,line2	DEL 100,266	Delete line range
DIR drive	DIR 2 or DIR 8	Disc directory list
GIR!	GIR!	View GIR! listing
LISTING start,end	LISTING or LISTING 10,300	Full Atascii listing
LVAR	LVAR	Variable X-reference
REN start, step	REN or REN 1,1	Renumber program
STRIP	STRIP	Remove REM statements
VAL number	VAL 2 or VAL $3F	Number conversion

Figure II: The Toolkit's 10 new Basic commands

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translation into hexadecimal and binary notation. Hexadecimal or binary numbers may be converted to the other bases using VAL and entered by prefixing the number with the $ or % signs respectively.

Directory enquiries

The DIR command is aimed, not surprisingly, at disc drive owners. Type the command followed by the drive number for a disc directory listing. Using Dos 2.5, the only restriction imposed by Toolkit is that the system must be configured for a maximum of two disc drives (plus the ramdisk if used) and three file buffers.

Realistically speaking, being limited to two drives is no great hardship since most people only need one and two drives are a luxury most of us cannot afford.

However, if he uses SpartaDos he can still use Toolkit and access all of them. This is due to the fact that SpartaDos uses the ram beneath the computer's operating system in a similar way to how Toolkit uses the ram beneath Basic.

Checksums

Most *Atari User* readers adopt the good habit of using GIR! to check their typing and the latest version, in the November 1987 issue of *Atari User,* is much quicker and easier to use than the original.

Toolkit incorporates GIR! to make its operation even easier – just type GIR! for the checksum listing. The only other difference is that you can no longer send it to your printer but think of how much paper you will save!

Finally, not only does Toolkit offer 10 great utilities as extensions to Atari Basic, but it also provides English error messages to complement the computer's error code number.

With Atari User Toolkit you need no longer feel embarrassed when your BBC Micro chums start talking about their Basic. At a fraction of the cost, you have better program development commands.

AUTHOR'S NOTE

I enjoyed writing Toolkit for Atari User. Nowadays it is fashionable to knock Basic as a programming language, and Atari Basic in particular because it is does not conform to the Microsoft standard.

I have a great affection for our version of Basic: It is easy to use, quite powerful for its size and it only costs 8k of memory. The enhancements provided by Toolkit enable you to spend more time programming and less waiting for utilities to load.

I use Toolkit myself – and what better recommendation can you have than that? The special offer on page 42 is totally in keeping with Atari's philosophy of power without the price!

DirSort it!

ALAN CRAWFORD can bring order to that cluttered up disc directory

IF you have a lot of discs full of programs you've written yourself or typed in from *Atari User* you may have noticed one of the less endearing features of the disc directory – it's very messy.

If you've got a packed disc, finding out if a particular file is on it would involve looking carefully through the entire directory. But, wouldn't it be a lot easier if the directory was in alphabetical order?

This would mean that if you had a number of files concerned with one program, all of which had the same filename but a different extension, they would now appear together on the disc directory. It's not really a vital facility, but it makes it a lot easier to keep track of where files are. And DirSort is just the program to do it.

It will work on Dos 2.0 or Dos 2.5 discs in single or enhanced density. Although it ignores deleted and unclosed files, it may under unusual circumstances crash if a file has become corrupted. This has never happened to me yet, but if you suspect a file to be faulty, use the *Verify Disk* option in the DISKFIX.COM utility supplied with Dos 2.5 to make sure the disc is safe.

If you don't have access to Dos 2.5 and are still using Dos 2.0, make a backup of your disc just in case a bad file causes DirSort to corrupt the disc further. Corruption is very unlikely but it's better to be safe than sorry.

Also once a disc has been sorted, deleted files cannot be unerased using DISKFIX.COM, even if the disc has not been written to since the file was deleted. So make sure you won't be wanting to recover any deleted files before you sort the disc.

Don't try to sort commercial discs, even if they seem to have normal directories. Some discs store program data in the directory sectors and sorting this would be fatal.

If you've got an assembler type in Program II and then type:

ASM,,#D:DIRSORT.BIN

to produce a binary file on your disc. I used MAC/65 to assemble the code but it should be easy to modify it so that it will assemble on the Atari Assembler Editor cartridge.

Those who don't have an assembler should type in Program I. Remember to use Get it Right! to check it and save a copy to disc before running it. When you are sure everything is OK. Run it and it will produce a binary file which can be executed from Dos.

If you think the principals of disc storage interesting and want to find out more about it, Atari's *Technical Reference Notes* and Compute's *Mapping The Atari* both contain a lot of useful information. Compute also publish a book by Bill Wilkinson called *Inside Atari Dos*.

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How Dos stores files on disc

To understand how you go about sorting the directory it's useful to understand just how Dos 2.0 and Dos 2.5 store files on disc.

When you save a file, the file management system – FMS – stores information about it in the directory. This is stored in sectors 361-368 on your disc and each of these eight sectors holds the directory information for eight files, giving a maximum of 64 files.

Each record is 16 bytes long and consists of a flag byte which indicates the file status – locked, deleted or unused. Two bytes each are used for the number of sectors in the file and where on the disc the file begins, with another 11 bytes for the filename and extension.

So sorting the directory involves reading the directory sectors into memory, sorting them into order and writing them on to the disc again. I've used a simple insertion sort algorithm which involves searching through the directory and finding the record which should be last in the directory.

This record is then swapped with the last record and the process is repeated, only this time we decrease the number of records to sort by one, ignoring the last record.

Eventually we reach the situation where the number of records to sort is one, which means we have finished. This isn't a particularly fast or clever algorithm but it is easy to implement and since we are working in machine code it is still pretty fast.

While that may seem on the face of it to be all there is to sorting the directory, in reality things are a little more complex. This is because of the way in which Dos stores the files themselves.

Each sector of a file consists of 125 data bytes, a pointer to the next sector in the file, a count of the number of bytes used in the sector and a note of the file number. The file number is used to verify file integrity.

So all the sectors of the first file in the directory have zero as their file number and so on – remember that machine code programmers count from zero, not one. If the file number in the sector and its place in the directory are different, the FMS reports an error.

However, since we have reordered the directory, the file numbers no longer match those in the directory, which makes it necessary to alter all the file numbers in each file.

We do this by first of all finding where the file starts from the information in the directory record. Using the pointers to the next sector in each sector of the file, we have to thread our way through each file on the disc, changing the numbers to their new values as we go. This takes rather a long time as we have to read every sector on the disc that contains program data and then write it out again.

That's a rough outline of the program. We read the directory in, sort it, write it out again and then thread our way through each file, changing its number. The first three stages only take a few seconds but the last can take upwards of 10 minutes on a really full disc.

Program I: Basic program to create a Binary load file. This can then be loaded using option L on the Dos menu.

```
100 REM DIRECTORT BASIC LOADER
110 REM BY ALAN CRAWFORD
115 REM (c)ATARI USER
120 REM Save this loader just in case.
130 RESTORE 500
140 PRINT "Creating D:DIRSORT.BIN"
150 OPEN #1,8,0,"D:DIRSORT.BIN"
160 FOR L=0 TO 597
170 READ D:PUT #1,D
180 NEXT L
190 CLOSE #1
200 END
500 DATA 255,255,0,64,251,64,186,142,6
3,66,169,1,141,1,3,169
510 DATA 238,141,68,3,169,65,141,69,3,
32,166,65,32,20,65,32
520 DATA 53,64,32,29,65,173,60,66,240,
3,32,174,64,169,20,141
530 DATA 68,3,169,66,141,69,3,32,187,6
5,96,32,70,64,173,60
540 DATA 66,240,8,72,32,96,64,104,141,
60,66,96,32,255,64,160
550 DATA 0,140,60,66,177,203,240,13,32
,8,65,238,60,66,173,60
560 DATA 66,201,64,144,239,96,32,255,6
4,165,203,133,205,165,204,133
570 DATA 206,169,1,141,61,66,160,5,177
,205,209,203,176,10,165,203
580 DATA 133,205,165,204,133,206,144,7
,208,5,200,192,16,208,233,173
590 DATA 61,66,205,60,66,240,8,32,8,65
,238,61,66,208,215,160
600 DATA 15,177,205,170,177,203,145,20
5,138,145,203,136,16,243,206,60
610 DATA 66,208,179,96,32,255,64,162,0
,160,0,177,203,48,21,160
620 DATA 3,177,203,153,61,66,200,192,5
,208,246,138,10,10,141,62
630 DATA 66,32,216,64,32,8,65,232,236,
60,66,208,220,96,32,38
640 DATA 65,160,125,185,66,66,41,3,13,
62,66,153,66,66,32,47
650 DATA 65,185,66,66,41,3,141,65,66,1
85,67,66,141,64,66,13
660 DATA 65,66,252,64,247,65,208,218,9
6,169,194,133,203,169,66,133
670 DATA 204,96,165,203,24,105,16,133,
203,144,2,230,204,96,169,82
680 DATA 141,2,3,32,56,65,96,169,87,14
1,2,3,32,56,65,96
690 DATA 169,82,141,2,3,32,106,65,96,1
69,87,141,2,3,32,106
700 DATA 65,96,138,72,162,8,169,194,14
1,4,3,169,66,141,5,3
710 DATA 169,105,141,10,3,169,1,141,11
,3,32,132,65,173,4,3
720 DATA 24,105,128,141,4,3,144,3,238,
5,3,238,10,3,202,208
730 DATA 233,104,170,96,169,66,141,4,3
,169,66,141,5,3,173,64
740 DATA 66,141,10,3,173,65,66,141,11,
3,32,132,65,96,152,72
750 DATA 138,72,32,83,228,48,5,104,170
,104,168,96,169,48,141,68
760 DATA 3,169,66,141,69,3,32,221,65,1
74,63,66,154,76,0,64
770 DATA 32,221,65,169,255,141,252,2,1
73,252,2,201,12,208,249,169
780 DATA 255,141,252,2,96,32,221,65,16
9,255,141,252,2,173,252,2
790 DATA 201,43,240,12,201,35,240,2,20
8,243,169,255,141,252,2,96
800 DATA 174,63,66,154,76,0,64,162,0,1
69,9,141,66,3,141,72
810 DATA 3,141,73,3,32,86,228,96,73,78
,83,69,82,84,32,68
820 DATA 73,83,248,65,65,66,75,32,84,7
9,32,83,79,82,84,32
830 DATA 84,72,69,78,32,80,82,69,83,83
,32,82,69,84,85,82
840 DATA 78,155,80,82,69,83,83,32,89,3
2,84,79,32,82,69,82
850 DATA 85,78,44,32,78,32,84,79,32,83
,84,79,80,155,68,73
860 DATA 83,75,32,69,82,82,79,82,33,15
5,0,0,0,0,0,0
870 DATA 224,2,225,2,0,64
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
100	CUS (F)	550	09V (O)	720	ULD (R)
110	CYS (O)	560	GUR (T)	730	1VX (X)
115	D9S (G)	570	27L (F)	740	OFX (4)
120	D3S (O)	580	FNH (O)	750	26H (N)
130	WRD (C)	590	37M (U)	760	VTC (L)
140	7WF (4)	600	GVM (G)	770	2HR (P)
150	S7G (V)	610	2JE (J)	780	3WX (V)
160	1NR (4)	620	37P (F)	790	391 (9)
170	7RD (5)	630	2KQ (N)	800	UG3 (V)
180	PU1 (1)	640	2KG (W)	810	N80 (K)
190	N28 (K)	650	14W (F)	820	RW9 (2)
200	D22 (7)	660	CVO (L)	830	QG5 (R)
500	176 (F)	670	2QQ (8)	840	RVT (A)
510	16W (F)	680	PSY (K)	850	QLJ (U)
520	OGJ (5)	690	X6Q (U)	860	KP6 (6)
530	YOS (H)	700	WT5 (O)	870	5PR (A)
540	1TO (X)	710	VN3 (A)		

Program II: MAC/65 assembly listing of Program I

```
1000      .TITLE "DirSort Directory Sor
ter"
1010      *=  $4000
1020      .OPT OBJ,LIST
1030      .SET 3,0
1040 ;
1050 DIRSCT = $0169  ;Directory start
sector.
1060 CURRENT = $CB   ;Pointer to curre
nt record.
1070 GREATEST = $CD  ;Pointer to great
est record so far.
1080 ;
1090 ;System Equates.
1100 ;
1110 DUNIT = $0301
1120 DCOMND = $0302
1130 DBUFLO = $0304
1140 DBUFHI = $0305
1150 DBYTLO = $0308
1160 DBYTHI = $0309
1170 DAUX1 = $030A
1180 DAUX2 = $030B
1190 DSKINV = $E453
1200 ICCOM = $0342
1210 ICBAL = $0344
1220 ICBAH = $0345
1230 ICBLL = $0348
1240 ICBLH = $0349
1250 ICAX1 = $034A
1260 ICAX2 = $034B
1270 CIOV =  $E456
1280 CH  =   $02FC
1290 ;
1300 ;Main Program Loop.
1310 ;
1320 DIRSORT
1330      TSX           ;Save initial sta
ck postion.
1340      STX STACK
1350      LDA #$01      ;Use drive #1.
1360      STA DUNIT
1370      LDA # <INITMESS ;Point to sta
rting message.
1380      STA ICBAL
1390      LDA # >INITMESS
1400      STA ICBAH
1410      JSR RETURN  ;Wait for return
key.
1420      JSR GETDIR  ;Get directory.
1430      JSR SORT    ;Sort it.
1440      JSR WRTDIR  ;Put it back.
1450      LDA MAX     ;Is directory emp
ty?
1460      BEQ FINISH  ;If so then finis
h.
1470      JSR TRACE   ;Rewrite file #'s
.
1480 FINISH
1490      LDA # <REDOMESS ;Display reru
n prompt.
1500      STA ICBAL
1510      LDA # >REDOMESS
1520      STA ICBAH
1530      JSR YESNO
1540      RTS           ;Return.
1550 ;
1560 ;Directory Sorting Module.
1570 ;Routines to perform an insertion
 sort on the memory image of the direc
tory.
1580 ;
1590 SORT
1600      JSR FINDMAX ;Find number of f
iles on disk.
1610      LDA MAX     ;Is the disk empt
y?
1620      BEQ EXTSRT
1630      PHA           ;If not, preserve
 value of MAX.
1640      JSR SHUFFLE ;Then sort it.
1650      PLA           ;Restore MAX.
1660      STA MAX
1670 EXTSRT
1680      RTS           ;Return
1690 ;
1700 FINDMAX
1710      JSR FRSTREC ;Set pointer to f
irst record.
1720      LDY #$00    ;No records found
 yet.
1730      STY MAX
1740 FINDLOOP
1750      LDA (CURRENT),Y ;Check flag b
yte.
1760      BEQ EXTFND  ;If it's zero, th
en we've reached the end.
1770      JSR NEXTREC ;Move to next rec
ord.
1780      INC MAX     ;Increase file co
```

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```
unt.
1790     LDA MAX      ;Have we read 64
files?
1800     CMP #$40
1810     BCC FINDLOOP ;If not then loo
p back.
1820 EXTFND
1830     RTS          ;Return.
1840 ;
1850 SHUFFLE
1860     JSR FRSTREC ;Point to the fir
st record.
1870     LDA CURRENT ;Set pointer to g
reatest to start.
1880     STA GREATEST
1890     LDA CURRENT+1
1900     STA GREATEST+1
1910     LDA #$01     ;It's the first r
ecord.
1920     STA POS
1930 SHFLOOP
1940     LDY #$05     ;Filename starts
at 6th. character.
1950 SHFLOOP2
1960     LDA (GREATEST),Y ;Compare cur
rent letter with greatest so far.
1970     CMP (CURRENT),Y
1980     BCS EQUAL    ;Branch if <=.
1990     LDA CURRENT ;It's greater so
make current record the greatest.
2000     STA GREATEST
2010     LDA CURRENT+1
2020     STA GREATEST+1
2030     BCC EXTSHF  ;Try next record.
2040 EQUAL
2050     BNE EXTSHF  ;If it's less the
n try next record.
2060     INY          ;If equal then tr
y next character.
2070     CPY #$10     ;Last character?
2080     BNE SHFLOOP2 ;If not, then lo
op.
2090 EXTSHF
2100     LDA POS      ;Is this the last
 record?
2110     CMP MAX
2120     BEQ SWAP     ;If so, then swap
 greatest with current.
2130     JSR NEXTREC ;New record.
2140     INC POS      ;Increase count.
2150     BNE SHFLOOP ;Loop around agai
n.
2160 SWAP
2170     LDY #$0F     ;16 characters.
2180 SWAPLOOP
2190     LDA (GREATEST),Y ;Get charact
er from greatest.
2200     TAX          ;Save it in X.
2210     LDA (CURRENT),Y ;Get characte
r from current.
2220     STA (GREATEST),Y ;Put it in g
reatest.
2230     TXA          ;Retrieve saved c
haracter.
2240     STA (CURRENT),Y ;And put it i
n current.
2250     DEY          ;Finished?
2260     BPL SWAPLOOP ;If not, then lo
op.
2270     DEC MAX      ;Any sorting left
 to do?
2280     BNE SHUFFLE ;If so, then loop
.
2290     RTS          ;Return.
2300 ;
2310 ;File Modification Module.
2320 ;Routines to thread through a lin
ked file and change file #.
2330 ;
2340 TRACE
2350     JSR FRSTREC ;Point to first d
irectory record.
2360     LDX #$00     ;File #0.
2370 TRCLOOP1
2380     LDY #$00     ;Check flag byte.
2390     LDA (CURRENT),Y
2400     BMI SKIPFILE
2410     LDY #$03     ;Point to start s
ector.
2420 TRCLOOP2
2430     LDA (CURRENT),Y ;Move start i
nfo from record to SECT.
2440     STA SECT-3,Y
2450     INY
2460     CPY #$05
2470     BNE TRCLOOP2
2480     TXA          ;Multiply file #
by 4 to generate mask.
2490     ASL A
2500     ASL A
2510     STA MASK
2520     JSR LINK     ;Thread through t
he links.
2530 SKIPFILE
2540     JSR NEXTREC ;Next record?
2550     INX
2560     CPX MAX      ;Finished?
2570     BNE TRCLOOP1 ;If not, then lo
op.
2580     RTS          ;Return.
2590 ;
2600 LINK
2610     JSR GETSCT  ;Get sector.
2620     LDY #$7D     ;Point to file #
byte.
2630     LDA SECBUF,Y ;Get it.
2640     AND #$03     ;Preserve sector
data.
2650     ORA MASK     ;Add new file #.
2660     STA SECBUF,Y ;Put it back.
2670     JSR WRTSCT  ;And write the se
ctor to disk again.
2680     LDA SECBUF,Y ;Use forward poi
nter in sector to select next sector.
2690     AND #$03
2700     STA SECT+1
2710     LDA SECBUF+1,Y
2720     STA SECT
2730     ORA SECT+1  ;Is next sector 0
? (End of file).
2740     BNE LINK     ;If not, then loo
p.
2750     RTS
2760 ;
2770 FRSTREC
2780     LDA # <DIRBUF ;Point to the s
tart of the directory buffer.
2790     STA CURRENT
2800     LDA # >DIRBUF
2810     STA CURRENT+1
2820     RTS
2830 ;
2840 NEXTREC
2850     LDA CURRENT ;Move pointer on
by one record (16 bytes).
2860     CLC
2870     ADC #$10
2880     STA CURRENT
2890     BCC EXTREC
2900     INC CURRENT+1
2910 EXTREC
2920     RTS
2930 ;
2940 ;Disk I/O Module.
2950 ;Routines to read and write direc
tory or single sectors.
2960 ;
2970 GETDIR
2980     LDA #'R      ;Read command.
2990     STA DCOMND
3000     JSR MOVDIR  ;Move directory.
3010     RTS
3020 ;
3030 WRTDIR
3040     LDA #'W      ;Write command.
3050     STA DCOMND
3060     JSR MOVDIR  ;Move directory.
3070     RTS
3080 ;
3090 GETSCT
3100     LDA #'R      ;Read command.
3110     STA DCOMND
3120     JSR MOVSCT  ;Move a sector.
3130     RTS
3140     ;
3150 WRTSCT
3160     LDA #'W      ;Write command.
3170     STA DCOMND
3180     JSR MOVSCT  ;Move a sector.
3190     RTS
3200 ;
3210 MOVDIR
3220     TXA          ;Save X register
on stack.
3230     PHA
3240     LDX #$08     ;8 sectors to wri
te.
3250     LDA # <DIRBUF ;Point to start
 of directory buffer.
3260     STA DBUFLO
3270     LDA # >DIRBUF
3280     STA DBUFHI
3290     LDA # <DIRSCT ;Point to disk
directory sectors.
3300     STA DAUX1
3310     LDA # >DIRSCT
3320     STA DAUX2
3330 DIRLOOP
3340     JSR ONESCT  ;Move one sector
to/from disk.
3350     LDA DBUFLO  ;Move buffer on b
y 128 bytes.
3360     CLC
3370     ADC #$80
3380     STA DBUFLO
3390     BCC DIRNXT
3400     INC DBUFHI
3410 DIRNXT
3420     INC DAUX1    ;Next sector.
3430     DEX          ;Done?
3440     BNE DIRLOOP ;No, so loop.
3450     PLA          ;Restore X-reg.
3460     TAX
3470     RTS          ;Return.
3480 ;
3490 MOVSCT
3500     LDA # <SECBUF ;Point to secto
r buffer.
3510     STA DBUFLO
3520     LDA # >SECBUF
3530     STA DBUFHI
3540     LDA SECT     ;Point to a disk
sector.
3550     STA DAUX1
3560     LDA SECT+1
3570     STA DAUX2
3580     JSR ONESCT  ;Fetch/Put sector
.
3590     RTS          ;Return
3600 ;
3610 ONESCT
3620     TYA          ;Save Y & X regis
ters.
3630     PHA
3640     TXA
3650     PHA
```

Turn to Page 20 ►

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◀ From Page 18

```
3660     JSR DSKINV  ;Perform disk I/O
.
3670     BMI DISKERR ;Report any error
s.
3680     PLA         ;Restore register
s.
3690     TAX
3700     PLA
3710     TAY
3720     RTS         ;Return.
3730 DISKERR
3740     LDA # <ERRMESS ;Display error
 message.
3750     STA ICBAL
3760     LDA # >ERRMESS
3770     STA ICBAH
3780     JSR PRINT
3790     LDX STACK   ;Restore stack to
 its original value.
3800     TXS
3810     JMP DIRSORT
3820 ;
3830 RETURN
3840     JSR PRINT   ;Print message.
3850     LDA #$FF    ;Clear keyboard b
uffer.
3860     STA CH
3870 RETLOOP
3880     LDA CH      ;Check buffer.
3890     CMP #$0C    ;Is it return?
3900     BNE RETLOOP ;If not then loop
.
3910     LDA #$FF    ;Clear buffer.
3920     STA CH
3930     RTS         ;Return.
3940 ;
3950 YESNO
3960     JSR PRINT   ;Print message.
3970     LDA #$FF    ;Clear keyboard b
uffer.
3980     STA CH
3990 YNLOOP
4000     LDA CH      ;Check buffer.
4010     CMP #$2B    ;Branch if 'Y' is
 pressed.
4020     BEQ YES
4030     CMP #$23    ;Branch if 'N' is
 pressed.
4040     BEQ NO
4050     BNE YNLOOP  ;Loop otherwise.
4060 NO
4070     LDA #$FF
4080     STA CH
4090     RTS         ;Exit program alt
ogether.
4100 YES
4110     LDX STACK   ;Restore stack t
initial value.
4120     TXS
4130     JMP DIRSORT ;Rerun.
4140 ;
4150 PRINT
4160     LDX #$00    ;Use editor (IOCB
 0).
4170     LDA #$09    ;Put record comma
nd.
4180     STA ICCOM
4190     STA ICBLL   ;Set max. record
length to $0909 (And why not?)
4200     STA ICBLH
4210     JSR CIOV    ;Call CIO.
4220     RTS         ;Return
4230 ;
4240 ;Program Messages.
4250 ;
4260 INITMESS .BYTE "INSERT DISK TO SO
RT THEN PRESS RETURN",$9B
4270 REDOMESS .BYTE "PRESS Y TO RERUN,
 N TO STOP",$9B
4280 ERRMESS .BYTE "DISK ERROR!",$9B
4290 ;
4300 ;Program Workspace.
4310 ;
4320 MAX .BYTE $00    ;No. of files on
disk.
4330 POS .BYTE $00    ;Current record n
o.
4340 MASK .BYTE $00 ;Used for alterin
g file #'s.
4350 STACK .BYTE $00 ;Used to save ini
tial stack value.
4360 SECT .WORD $00  ;Pointer to next
sector to load.
4370 SECBUF ;         Sector buffer 128
 bytes.
4380 DIRBUF = SECBUF+$80 ;Directory bu
ffer 1k.
4390     *=  $02E0    ;Putting this on
the end causes binary file to run.
4400     .WORD DIRSORT
```



It's a challenge!

Mike Cook helps you pick up the gauntlet to solve quite a devious programming problem

HINTS AND ALGORITHMS

IN our March issue we set out a programming challenge to test a roulette gambling method. The strategy was always to bet on the red numbers and if you lost, to double the bet until you won.

This month we present you with a plain English description of how to translate the betting strategy into a program. You can refer to the March issue to compare the techniques here with the original problem.

In the next edition of *Atari User* we will give you a no-frills program that will do the job, along with suggestions for further improvement. You can check this against your own efforts and perhaps sort out any points you had difficulty with.

Remember, as far as a program is concerned there are as many right answers as there are wrong ones, but the solutions I favour are simple and readable.

I will avoid, as much as possible, using fancy tricks or so-called clever programming techniques, as most of the time they are not necessary.

So, without further ado, I present the hints for the casino problem...

THERE are many ways of writing a program: One method is called *top down* programming, where you plan the outermost level of your code first and work down, sub-dividing the problem until you reach the nitty-gritty.

I prefer to write the crux routine first and build the rest of the program around it. This is usually known as *bottom up* programming although I call it *middle out*, as the first routine you write ends up in the middle of the code and you put all the fancy extras around it. Let's see how we can program this problem using the bottom up method.

There are 37 positions on the roulette wheel, ranging from 0 to 36, so the first thing we have to do is to produce a number in that range. In general, the random number function INT(RND(0)*N+1) will generate a number between 0 and *N*. So to get our roulette value we use the expression INT(RND(0)*37).

Having spun the wheel we need to see if the number generated is a red number, in other words have we won? The red numbers are:

```
15,4,2,17,6,13
11,8,10,24,33,20
31,22,29,28,35,26
```

We could test these against our random value from each spin with a separate IF statement but this would take 18 lines.

```
IF roll=15 THEN
IF roll=4 THEN
IF roll=2 THEN
```

There is a rule in computing that when you find yourself writing nearly identical lines of code, there is an easier way to do it.

In this case the answer is to use an array to hold the red number data, so that we need only have one IF statement inside a loop.

Before we enter the loop we must set a variable – *WIN* would be a good name. Then if one of our array values matches the spin we change its value to something else.

However, we need to initialise the array at the start of the program by reading the red numbers from a data statement.

Having found out whether we have won, appropriate action can be taken – either add twice the bet money to our pot if we have won, or double the bet if we have not. At this point we need to test if we have the amount to cover the bet in our pot – if not we are broke and the run ends. Otherwise we subtract our bet from the pot and try again.

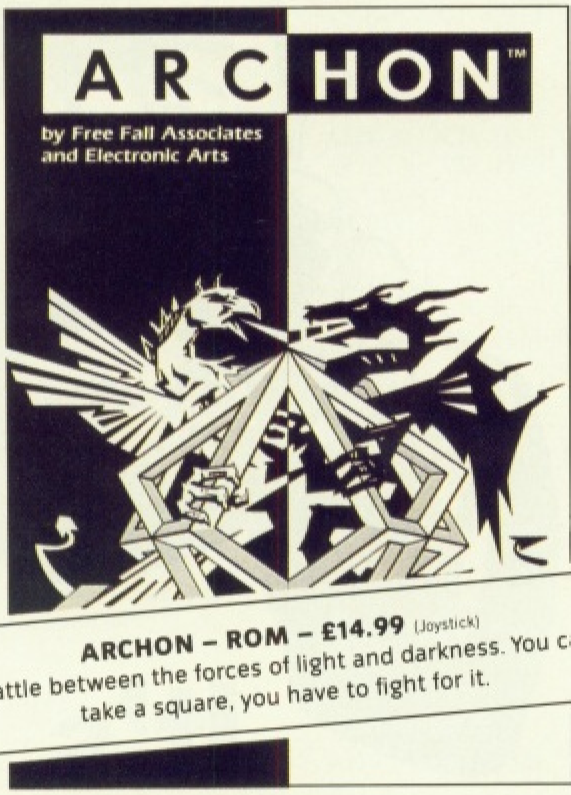
We should also keep track of how many bets we have placed. That should be easy, simply increment a counter every time – and look for some criteria for when to stop, other than losing all our money.

For example, we could stop when we have doubled our initial pot, or when a certain number of bets have been laid. It would also be useful to keep track of the largest bet we have had to place.

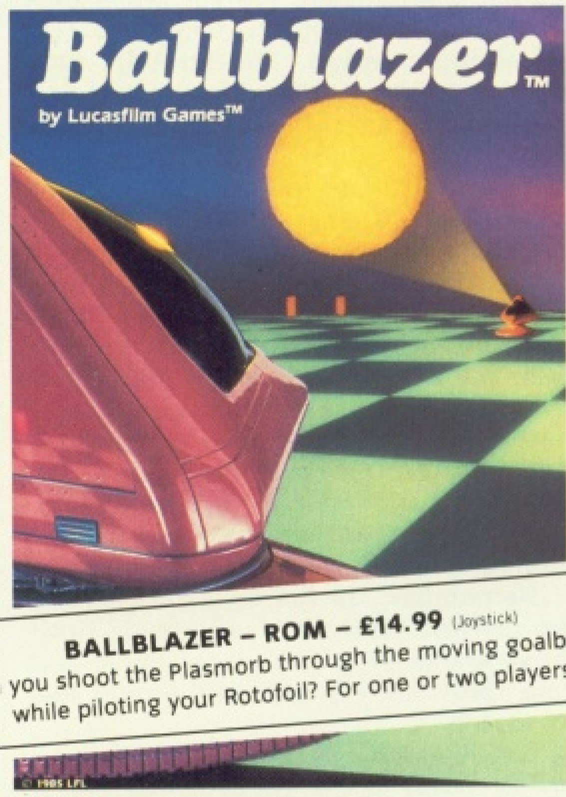
Finally to stop the program looking boring when it's running, after each bet let's print its value and what's in the pot as well as the bet number every spin of the wheel.

● *Well, what are you waiting for? Get tapping away at that micro and I'll see you next month with a solution.*

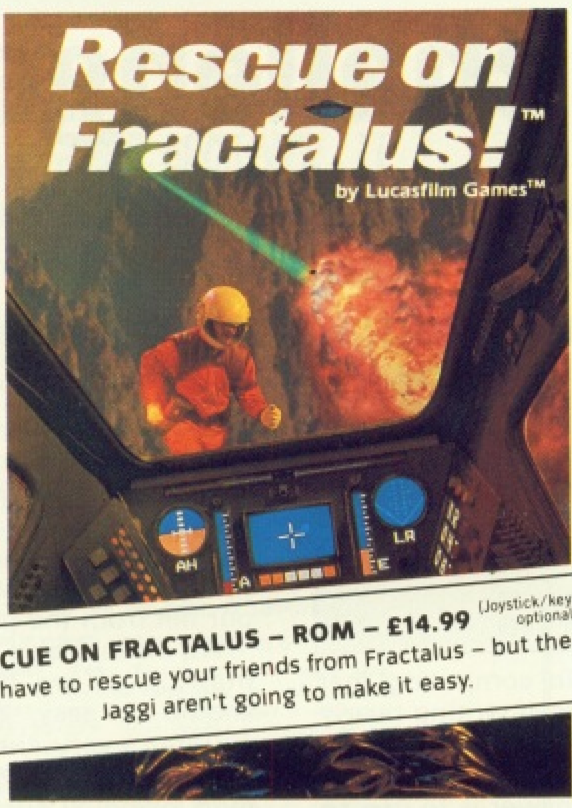
THE LATEST AND



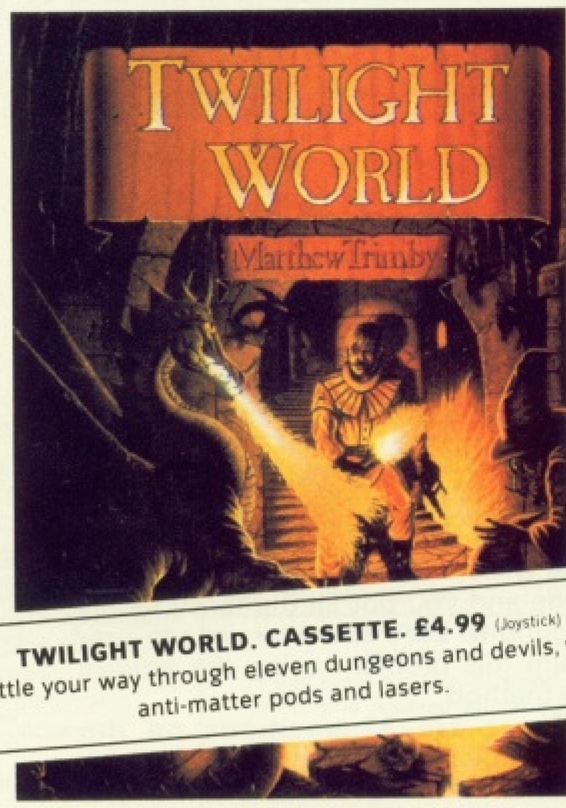
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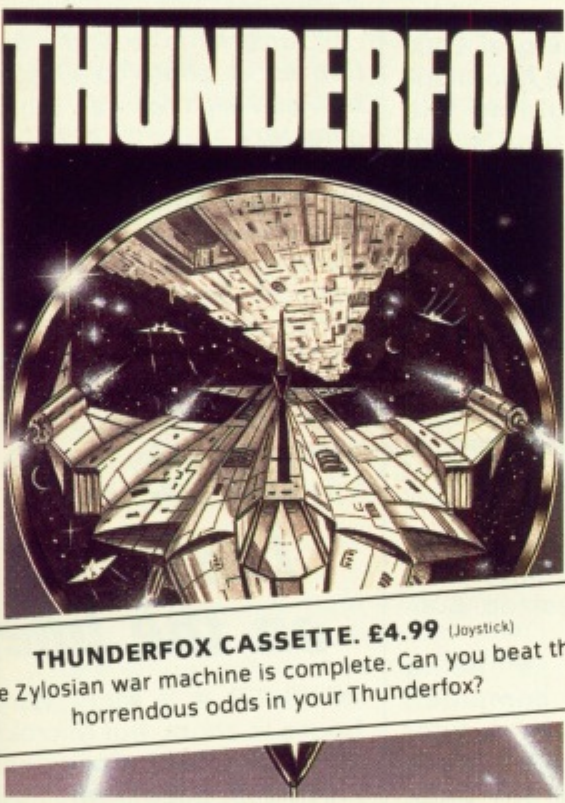
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NEWS...NE

More power, speed for MicroLink

MAJOR improvements to MicroLink have been announced, following the successful outcome of prolonged negotiations with Telecom Gold.

The enhancements are based on speeding up connect time on the system, with the aim of bringing down the cost to subscribers.

"With the vast increase in telex traffic in particular over

Costs will be cut

the last few months, one of our top priorities has been to simplify the sending of messages", said the head of MicroLink, Derek Meakin.

"Our programmers have achieved a significant breakthrough which we are now implementing. We are also completing the switch to our new Prime 9955 computer which provides more than four times more power than has been available to MicroLink subscribers so far.

"The other big development is the opening of 2400 baud access to the MicroLink computer – doubling the speed at which users can transmit and receive data".

Now disabled study at home

PHYSICALLY disabled people in London are being helped toward employment with the aid of MicroLink.

Over the next three years 60 housebound residents of the Borough of Greenwich will be given the chance to study computing and information technology in their own homes.

Aim of the scheme, funded by the Urban Aid Programme and Greenwich Council, is to enable trainees to eventually either gain employment as outworkers for businesses or to become self-employed in computer-related activities such as programming, word processing or desktop publishing.

Each trainee is being provided with a computer, modem and printer. A tutor will regularly visit each trainee to sort out any problems and to check on their progress.

"But there will also be a constant 24 hours a day computer link to the base at Greenwich ITeC through MicroLink", said tutor Marion Robeson.

"The first 20 students start this year and should be fully trained after twelve months.

"During the year we hope employers will be found who are willing to provide work experience for the trainees".

DIAL FOR A DEMO

COMPUTER users who haven't yet seen the massive range of facilities MicroLink has to offer can now logon directly for a free interactive demonstration – and all from the comfort of their own home or office.

All they need is a 1200/75 baud modem and telephone connection to 01-583 1275.

Once online, at the >PAD prompt simply key CALL 72 then Return. When asked to sign on, key ID MAG111 then Return. The password DATABASE, followed by Return, will bring up the menu.

There are four sections to browse through – communication, information, services and leisure – each describing a different aspect of the system.

"This free demo vividly illustrates that MicroLink has lots to offer everybody from hobbyists to business executives", said head of MicroLink, Derek Meakin.

Wanted – a disaster

IF anyone out there has recenty found disaster turning into a crisis, there could be a silver lining to their troubles.

A company on MicroLink specialising in providing locations for films and still photography is asking ohter users to help.

"We've got a stinker of a job", says spokesman Kell Gatherer.

"Our brief is to find a location for a photo to illustrate an advert for a smoke detector.

"We need a recently burnt-out detached house whose roof timbers are charred and standing out against the sky – we're so desperate, any part of the country would do.

"We're offering a small reward to any MicroLink user who finds the building we eventually use".

Laying it on the line

WHISPER it if Mary Whitehouse is about, but MicroLink subscriber Keith Channing is looking for people who like to take their clothes off.

Not that there's anything naughty going on. Keith is membership secretary of CORAL – standing for Clothes Optional Recreation and Leisure – which is a beach, camping, and general outdoor naturist group.

At present he is trying to bring together all those MicroLink subscribers who are naturists so that they can chat about their pastime via electronic mail.

In the best possible taste

IT is immensely pleasing, though as we adventurers would stoutly maintain, unsurprising and only natural, to see that adventures are still very much up there with the other types of entertainment software when it comes to the inevitable round of software award ceremonies.

One of the accolades recently dished out at such a prestigious software industry awards binge was for the adventure of the year.

If you take a quick peep back at the January issue of *Atari User*, you'll see that my vote for the best adventure went to Infocom's Stationfall, which marked the welcome return of Floyd the mischievous, scatterbrained, but ultimately loveable chatterbox of a robot.

To my mind, Stationfall has one of the most engaging and teasing plots, with superb writing, imaginative puzzles and, without a shadow of a doubt, the most dramatic ending ever written for a computer adventure game. And, the piece de resistance, Stationfall has Floyd.

Now I don't like to boast about my undoubtedly fine judgement, but the aforementioned prize for best adventure of the year was awarded – you've guessed, of course – to none other than Stationfall.

Runner-up was Rainbird's Guild of Thieves which, if you look once more at my list in the January issue, was also my second-placed favourite.

So there you are. Any unbiased observer simply has to be forced to the conclusion that either the judges first read Rouloc's column and decided that his impeccable assessment was good enough for them and just followed his lead, or that they all have the same unquestionably excellent taste as myself. Well, that's my opinion and I'm sticking to it!

Looking back just once more – promise – to my list of best adventures you'll notice that in third place is the very funny and innovative Hitch-Hiker's Guide to the Galaxy. This leads me neatly, and quite coincidentally, to my next piece of news.

Although it's not just about adventures, I simply must tell you about a smashing paperback that my good friend Brillig – of *ST User* fame – has just kindly loaned me. Do you know, once I picked up this book with my hot little hands, I just couldn't put it down until I had read every one of its 182 highly entertaining pages.

The paperback has the words *Don't Panic* written in large friendly letters on the front cover and is called The Official Hitch-Hiker's Guide to the Galaxy Companion. It has been written by Neil Gaiman, is published by Titan Books of 58 St Giles High Street, London WC2H 8LH and costs a measly £3.95.

The OHHGTTGC – I can't type that title out again in full or I'll be here all day and there are still plenty of trolls to be trounced before nightfall – charts the complete history of the famous series and includes many extracts not previously published, mainly because they were cut from final versions.

Everything you ever wanted to know about The Guide, the making of the different series – radio, book, TV, and so on – the characters and the life and times of the original author, Douglas Adams, is here. And there's a whole chapter on the famous computer game, hence it's relevance to this column.

Neil Gaiman has written the whole thing in a witty and light-hearted style that blends perfectly with the material itself. There are bags of quotes, interviews, anecdotes and insights. It really makes you want to go back to

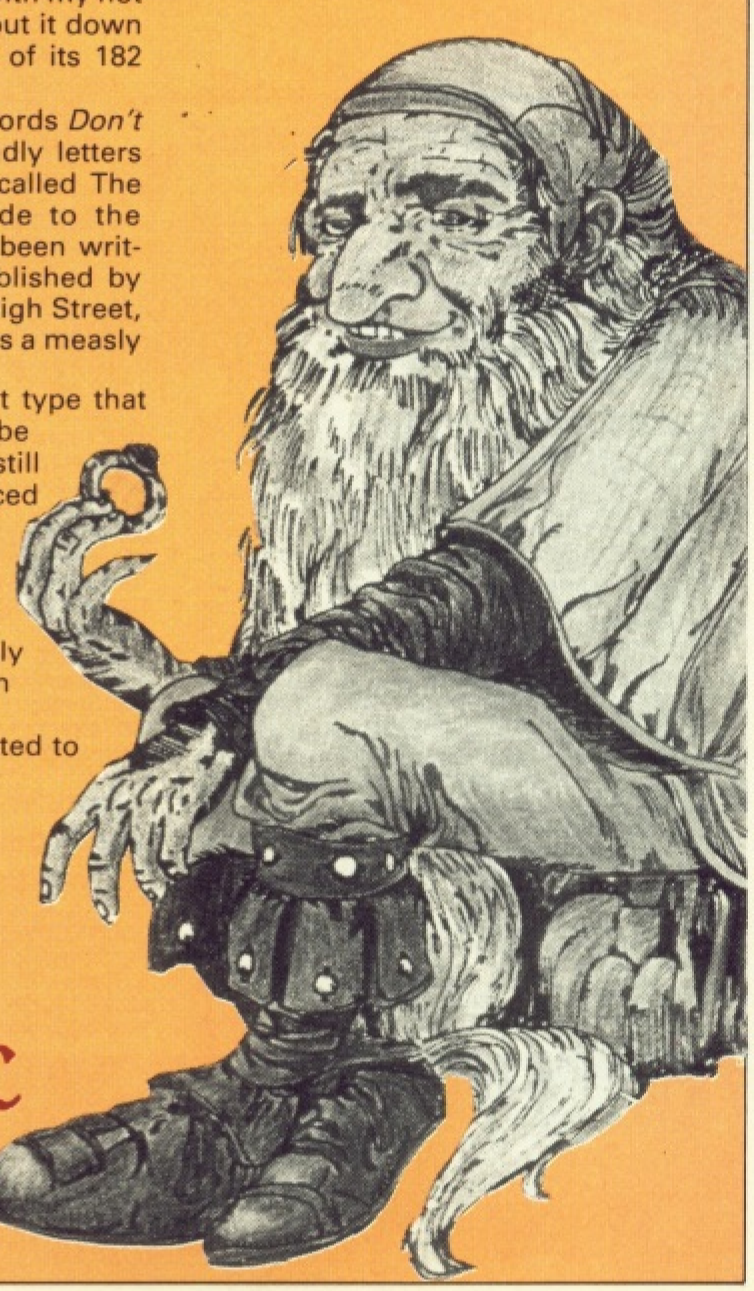
Turn to Page 26 ►

WENDY'S RAVES

Here's a list of Wendy Albiston's favourite adventures. Although it doesn't quite match mine – but who's could – it does reflect the point that everyone has different tastes. Thanks Wendy.

1. Stationfall (Infocom)
2. Hitch Hiker's Guide to the Galaxy Infocom)
3. The Pawn (Rainbird)
4. Jewels of Darkness (Rainbird/ Level 9)
5. The Dark Crystal (Sierra On-Line)
6. The Guild of Thieves (Rainbird)
7. Spellbreaker(Infocom)
8. Ballyhoo (Infocom)
9. Gnome Ranger (Rainbird)
10. Mordon's Quest (Melbourne House)
11. Suspect (Infocom)
12. The Hulk (Scott Adams)

by Rouloc



◀ *From Page 25*

the original books and read them again, immediately.

As Douglas Adams is reputedly to have said about Gaiman's book: "Certainly the most outstandingly brilliant book to have been written about the HHGG since this morning.". Go buy it, settle down with a Pan Galactic Gargle Blaster and enjoy.

Finally, there's just room to mention two of your letters. Sam Ingram of Wolverton is stuck in Quest For Eternity. He has found the cartridge and the manual but can not open the crate or get the computers to work. Can anyone out there help him?

The second letter is a real mystery. It takes the form of a diary recording the encounters on different levels in Alternate Reality – and is signed Alien.

Accompanying it were some enormous hand-written maps covering the first four levels of that adventure. I don't know who you are, Alien, but your documents sure as heck impressed me.

Until next month, keep out of swamps and slime pits.

THE PAWN: Solution – Part three



In the chamber with the dragon shine white at the shadows. Point at the shadows then go North. Throw the potion bottle at Kronos and press the nozzle. Look inside the top hat, examine the rabbit and the rack.

Get the pointy hat, wand and cloak. Wear the cloak and hat and go to hell where the devil waits. Give the aerosoul to the devil. Go to the entrance by the small cave near the laboratory and open the doors. Go South and knock on the door. Say "no", then go South and examine the listing. Type in the word DEBUG and press Return.

Go to the cavern near the lava river and move the pedestal to get at the key. Go to the snowman and melt him with white. Go to the store and get the spiky boots and wear them. Get the prism and unlock the door on the landing. That's all I'm telling!

Once you've examined the listing and typed DEBUG, you can keep on experimenting and exploring without getting killed. You won't have got all the points, but at least this partial solution should have helped you through most of the problems.

Why not start again now and tackle it more comprehensively? But before you do, try typing DEBUG and going past the southern edge of the adventure.

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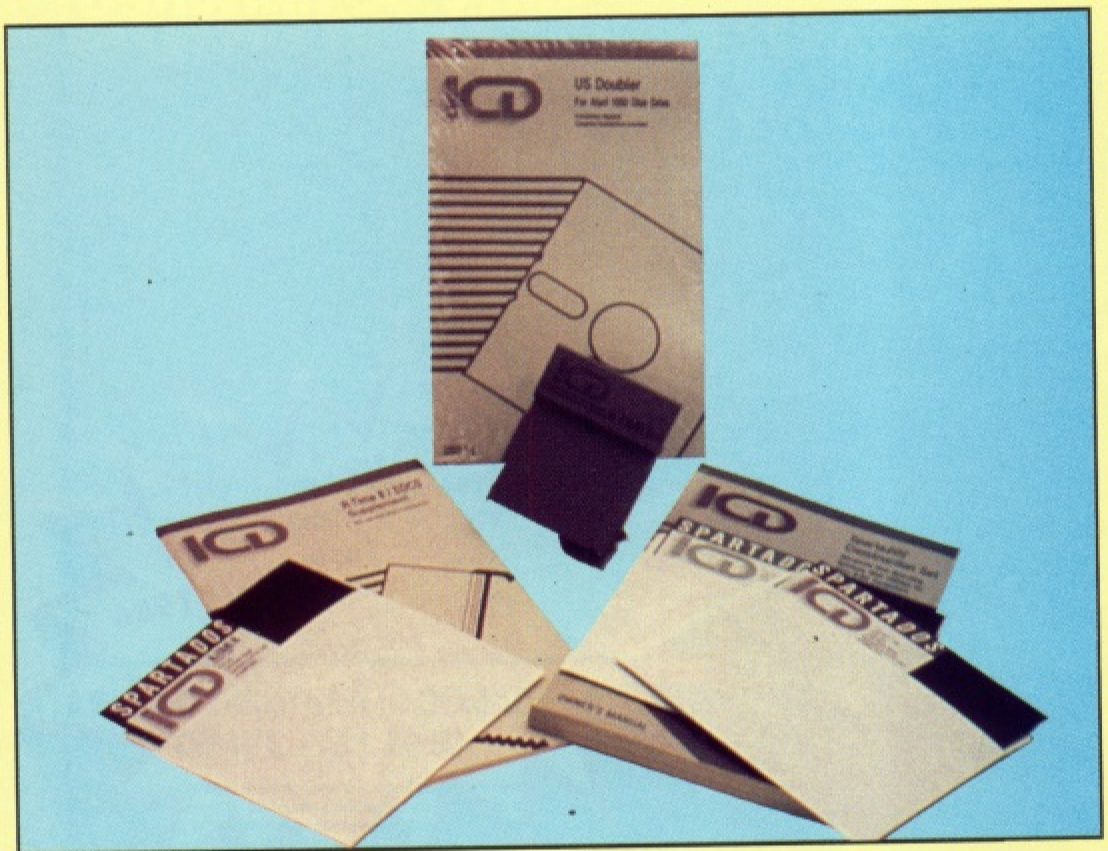
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Format + write Dos (Double)	48.0	–	32.9
OPEN, write 10,000 bytes, CLOSE (Single)	12.6	11.6	9.3
OPEN, write 10,000 bytes, CLOSE (Double)	15.3	–	7.9
OPEN, read 10,000 bytes, CLOSE (Single)	10.7	10.4	4.4
OPEN, read 10,000 bytes, CLOSE (Double)	10.2	–	3.8

Dos 2.5 Double density figures refer to enhanced density mode. True double density is only available with a US Doubler

Figure I: 1050 Speed comparison table (in seconds)

COMPANIES in the USA have been producing 8 bit Atari products for many years, but their products always had the disadvantage of being rather expensive in this country. UK dealers had to order their stock directly from US wholesalers, giving rise to some pretty hefty shipping and customs charges.

Recently, however, one or two UK Atari distributors have struck deals to supply US products at very reasonable prices. There are still only a few available and in future issues of *Atari User* we'll take a look at some of them, but for the moment let's consider the SpartaDos range of products by ICD, now released by Frontier Software.

SpartaDos is probably the most sophisticated disc operating system for the 8 bit, and knocks spots off Dos 2.5 and the happily now extinct Dos 3.

It supports multiple sub-directories (known as folders on the ST), full time/date stamping of files, full random access to any byte within a file, batch command files, hard disc access, and a whole host of more specialist features.

It also keeps most of its code locked away under the operating system so you get more free memory for your programs. Even with the most powerful configuration (version 3.2) you will still have 32,501 free bytes available to Basic, and the smaller versions can leave as much as 36,176 available. These figures should be set against 32,274 with Dos 2.5 and 37,902 with no Dos at all.

If you also use ICD's R-Time 8 battery backed-up clock cartridge the correct time and date will always be available, and they will be stamped on each new file created. The clock module plugs into the standard cartridge port and has a replacement socket on the top for another cartridge.

I have tried it with every cartridge I've got – Action!, Mac/65, Basic/XE, AtariWriter and so on – and it seems completely transparent to everything. There is even a Z: driver which allows you to access the clock directly from Basic.

However, where SpartaDos really

comes into its own is in conjunction with another ICD product – the US Doubler. This comes in the form of two new plug-in ICs for your 1050 drive which not only give it the ability to work in true double density but also speeds up the data transfer rate considerably.

The installation instructions are clear and concise, but you will need to take your 1050 apart to get at the motherboard. Although there is no reason why a complete novice shouldn't be able to fit the chips – it's not a difficult task – some caution should be exercised since opening up the casing invalidates your guarantee.

Once you've got into the drive – and some are so well constructed you'll virtually need a can opener – you must remove the two existing ICs from their sockets and install the ICD replacements.

Some older 1050 drives were fitted with slightly different chips – and if you have the wrong type you have the option of chickening out and sending off for the matching US Doubler ICs, or of making a very simple adjustment to two jumper leads on the board. This second option does require the use of a soldering iron, so think carefully if you do happen to find yourself in this situation.

Once installed, and it is only the work of half an hour once you've read the instructions, your drive is supercharged. Upon booting your SpartaDos master disc the old bleep, bleep, bleep sound is replaced by a stacatto burst of machine-gun fire.

Reading data from the disc is roughly four times faster than with a standard 1050, but after allowing for seek time – the time taken to move the head around the disc – the average speed increase is nearer three times. The increase in speed of writing is slightly less at roughly twice as fast – see Figure I for full benchmark timings.

The other major feature of the US Doubler is to give access to true double density, giving 180k per disc as opposed to 90k in single or 130k in enhanced density.

Double density actually uses 720 sectors per disc, as with single density, but each sector contains 256 bytes of data rather than 128. This does mean that you'll have to remember to format and write in standard mode if you want to give a disc to someone without a US Doubler, but this is very simple since SpartaDos is intelligent enough to detect what type of disc it is using.

SpartaDos has so many features that it's impossible to describe them all in full, but Figure II will give you some idea of its amazing power and flexibility when compared with Dos 2.5.

I particularly liked the time/date stamping of files and the excellent sub-directory facilities – and also their ease of use from Basic and other languages. I prefer to use command processors rather than menu systems for ease of use, but that said, a very comprehensive menu system is available for beginners.

Whichever of the many configura-

Dos 2.5	SpartaDos	Function
A	DIRS	Disc directory, any drive (Dos 2.x format)
B	CAR	Go to cartridge (if present)
C	COPY/XCOPY	Copy file(s) (multiple drives)
D	ERASE	Delete file(s) from disc
E	RENAME	Rename file(s) on disc
F	PROTECT	Protect file(s) from accidental erasure
G	UNPROTECT	Remove erasure protection from file(s)
H	n/a	Write Dos files (handled during format by XINIT)
I	XINIT	Format disc (see also AINIT)
J	DUPDSK	Duplicate whole disc
K	SAVE	Save binary file (see also APPEND)
L	LOAD	Load binary file (see also OFF_LOAD)
M	RUN	Run machine code at given address
N	n/a	Create MEM.SAV (SpartaDos is always in memory)
O	XCOPY	Copy file(s) (single drive) (see also SPCOPY)
P	AINIT	Format (Single density Dos 2.0 mode)
	APPEND	Save binary file at end of existing file
	AUTOBAT	Select batch file to run when Reset is pressed
	BASIC ON/OFF	Turn internal Basic on or off
	BOOT	Set filename to load when no Dos present on disc
	BYPASS	Modify hard disc drive access number
	CHKDSK	Give current disc statistics
	CHTD	Change time/date stamp on file(s)
	CHVOL	Change volume name of disc
	CREDIR	Make new sub-directory
	CWD.	Change default path details for current drive
	DATE	Set system date
	DELDIR	Delete sub-directory (must be empty)
	?DIR	Show path to specified sub-directory
	DIR	Disc directory (Extended format: time/date/bytes)
	DUMP	Print file as Ascii + hex digits to screen
	KEY ON/OFF	Type-ahead buffer on or off
	LOCK/UNLOCK	Protect whole disc from write operations
	MDUMP	As for DUMP, but to print memory contents
	MEM	Show current Dos lomem/himem values
	MENU	Load menu system (may be set as default)
	OFF_LOAD	Binary load file, with offset
	PAUSE	Wait for a key to be pressed (in batch files)
	PORT	Change the RS-232 configuration
	PRINT	Echo screen output to another device like P: or C:
	PUTRUN	Add run address to binary file
	RD	Set up ramdisc (many configurations available)
	RPM	Test disc drive rotation speed
	RS232	Load RS-232 driver for 850 module/P:R: connection
	TIME	Set system time
	TDLINE	Load time/date header line routine
	TD ON/OFF	Turn time/date line on or off (requires TDLINE)
	TREE	Show all sub-directories/files (alphabetical)
	TYPE	Show Ascii file contents on screen
	VERIFY ON/OFF	Turn disc write verify on or off
	XDIV	Turn off I/O redirection (disable PRINT/batch mode)
	ZHAND	Activate Z: for time/date handling from Basic
	-filename	Execute batch command file (extender = .BAT)
	filename	Execute machine code file (extender = .COM)
	Dn:	Select new default drive number, n

Figure II: Dos 2.5 and SpartaDos features comparison

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◀ From Page 29

tions you decide to use, the manual provides clear instructions for every feature, even down to such things as file formats and fully documented machine code access.

SpartaDos can also read, write and format Dos 2 discs automatically, so you need never worry about which type you currently have in the drive. It can even handle a hard disc if you happen to have one.

I've come across a couple of minor quirks, but nothing too serious. One thing I did find was that files opened for access in update mode will be extended in size if you try to read a byte beyond the current end-of-file marker.

This is acceptable when writing additional data, but when reading I feel you should receive an error message. For example, if you have a disc file containing a single line of text and you try to read in two lines while in update mode, the file will quickly be extended to fill all available space on the disc.

The moral is never read beyond the end of a file in update mode.

I would thoroughly recommend both SpartaDos and the US Doubler, and at £49.95 they're a give-away compared to the import prices – you'd have paid £79.95 for the US Doubler alone.

The R-Time 8 is also quite useful, but by no means essential unless you are using a mass storage device such as a hard disc – after all you can always use the TIME and DATE commands at the start of a session. Otherwise it's still a little pricey at £49.95.

However, if you are still using an unmodified 1050 with Dos 2.5, now is the time to move up to the power and flexibility of SpartaDos.



130XE with R-Time 8 and cartridge fitted

Products: SpartaDos	*£29.95*
US Doubler	*£29.95*
SpartaDos + US Doubler	*£49.95*
R-Time 8 cartridge	*£49.95*

Supplier: Frontier Software, PO Box 113, Harrogate, North Yorkshire, HG2 0BE.
Telephone: 0423 67140

SoftwarE SCENE

On-the-ball management simulation

Product: League Challenge
Price: £1.99
Supplier: Atlantis, 28 Station Road, London SE25 5AG.
Tel: 01-771 8642

THIS is a game of management that allows you as a football critic to take the hot seat and prove your worth by taking charge of a league team.

You have the chance of aiming for Division One, and maybe even completing the double by being voted Manager of the Year.

League Challenge is loaded in two parts – the main program followed by a short amount of data. Once loaded you are asked to sign on the dotted line and select your team. There are 64 names available to choose from or you can use your own 14 character name.

The screen displays are mainly text but there are some graphics during matches.

You start the actual game with the mid-week options – looking over your playing staff as well as your club's statistics. You can load and save data here to allow you that mid-season break to relax.

The save option only saves the necessary data, so the main program has to be loaded first.

Mid-week decisions lead you into the preparation for your first league match. Your earlier training choice may well determine your fate on Saturday: Do you choose an easy session or do you put your players through their paces?

It's up to you, but the cost of training increases with your level of choice.

Now it's on to team selection time. The ratings for defence, midfield and attack are shown along with both teams' fitness rating allowing comparisons to be made.

Individual players have both a skill and a fitness level which vary from one to nine. The former remains the same throughout the season but, fitness will fluctuate depending on whether a player is resting or playing.

You can change your team's formation by selecting and removing players to field a combination which best matches your opponents.

League Challenge then switches to a very basic graphics mode which is, however, sufficient for playability. So sit back and watch the action as the goalmouth highlights are shown.

Once it is all over, the match result is displayed along with any injuries incurred. The results of the other matches in your division are also shown with a full league table.

Your weekly turnover is shown at the end of each match – you can go into debt, but only to the amount of £250,000. Pass this and the club is declared bankrupt and the game starts afresh.

So be careful when you buy players. But make sure you have the money in the bank before writing that cheque because it won't bounce – you will – right back to the start. Players available for transfer are shown from time to time and as a maximum of 15 players is allowed in a squad at any one time remember to leave a space for that star signing.



There are 15 league matches to be played in a season together with knock-out cup matches.

An important consideration for cup matches is fitness. If a replay is necessary the option for team re-selection is not available, so it may be advisable to use players with a high fitness rating.

When the season is over you receive a bonus payment which depends on your league position. The top three teams are promoted while the bottom three are relegated.

You keep the same players for the start of the following season, but their skill and fitness levels may change.

All in all it is a good game – not an original theme, but it does have variations on other similar ones. It's very easy to use and offers entertainment for both novice and expert.

The screens change quickly and only the match highlights are shown, so there's no time for tedium to set in. Sound could have been used to add atmosphere to the match highlights: It would have been nice to hear the roar of the crowd when a goal was scored.

The graphics are a little on the weak side and the game deserved more time and effort being devoted to this area. But overall playability is the most important factor. Everyone likes glossy graphics and sound but if – as in this case – the game is addictive and enjoyable then that's what counts the most.

Keith Pattison

Sound............N/A
Graphics............4
Playability............8
Value for money............8
Overall............7

Software Scene

Nerve-tingling combat

Product: Computer Ambush
Price: £19.99
Supplier: SSI/US Gold, Units 2/3 Holford Way, Holford, Birmingham BS 7AX.
Tel: 021-356 3388

"THUS those unable to understand the dangers inherent in employing troops are equally unable to understand the advantageous ways of doing so."

This is a quote taken from The Art of War by Sun Tzu around 500 BC which makes reference to the tactical deployment of troops in a battle.

Computer Ambush from Strategic Simulations – SSI – is a wargame based on this theme and one that superbly captures the nerve-tingling excitement and fear of war.

The game puts you in command of a troop of American GIs in France during World War II pitted against a squad of German soldiers in a small village.

You can choose whether you want a computer or human opponent, and depending on your choice you are offered a list of different scenarios.

You can select from various options such as sound on or off, whether you can see the enemy or not, and how long each play turn lasts. These will affect the game, so choose wisely.

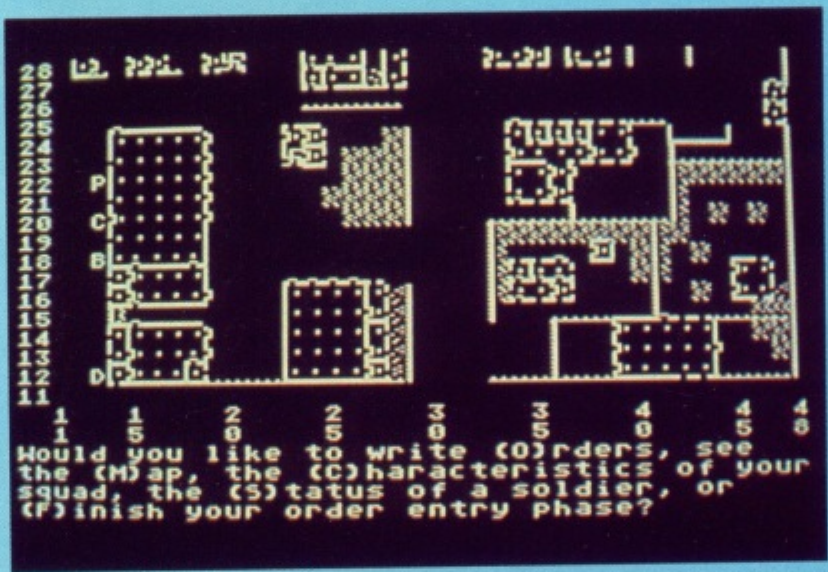
As with all SSI simulations, the game is split into different sequences of play, or phases as they are known – entering commands for the deployment of troops, allowing the computer to resolve the battle situations, receiving reports on the results and save a game.

A map of the village can be displayed at any time but the full map is too large to be shown in its entirety. When this option is chosen you are asked which row of the map you want to appear on the bottom of the screen and only segments are shown.

Because the game is based on the individual actions of all soldiers, each has his own characteristics which affect his actions within a given scenario – very similar to characters created in fantasy role-playing games.

The players' characteristics include rank, name, body weight, physical strength, dexterity and so on.

Each soldier can be given many different orders, entered in an abbreviated form. For example PB means prepare bayonet and HH is the order to engage in



Your view of the combat

hand-to-hand combat. At any time during the game any soldier's status report can be called giving, for instance, his position or any wounds he has received.

The move command is brought into play by using M followed by parameters that control who goes where, and the distance and manner in which progress is made, for example, crawling or running.

The rules here are quite involved, but are explained in great detail in the manual.

Three types of weapons are available – fire types (bolt action and automatic rifles), explosives (hand grenades) and hand-to-hand weapons (knives and bayonets). Here again, the rules are involved, but they are well covered in the literature.

One section contains dossiers on the individual soldiers on both sides. I particularly liked this as it made for interesting and amusing reading.

The American soldiers have what can only be called Yankee names such as Sergeant J.C. "Buck" Padooka, Corporal Rodney "Rich-Boy" Richfield and P.F.C Aloysius "Gunner" Garrity.

The same applies for the Germans, with names like Obergefreiter Erick Braun and Obergefreiter Ludwig "Lover" Schneider. I was left in no doubt who I was fighting.

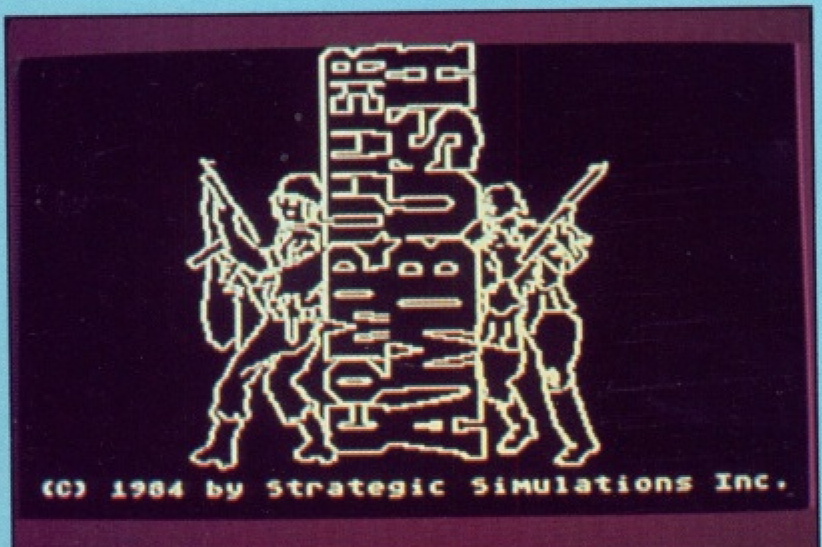
The packaging is superb. The box contains a rule book, game disc, two mapboards, grease pencils and two squad cards.

This is quite a complicated game to get to grips with but once you have achieved a good working knowledge of the rules the simulation will flow quite smoothly – and you do have the help of quick reference sheets.

The computer interpretation of the mapboard is well done and very easy to follow. And the map you can draw on is an invaluable aid and a very good idea.

I found it very easy to totally immerse myself in this challenge and there was more than one occasion when I was panicking when the Germans had me cornered. Even though it carries quite a hefty price tag – £19.99 – it's well worth every penny.

Neil Fawcett



The opening screen

Documentation	10
Graphics	7
Playability	10
Value for money	10
Overall	10

Flight of fantasy



Program: Space Shuttle
Price: £1.99
Supplier: Firebird, 64-76 New Oxford Street, London WC1A 1PS.
Tel: 01-379 6982

IF the title sounds familiar it's because this is a budget re-release of a 1983/4 game from Activision. Firebird has snapped up all Activision's old titles, so we can look forward to seeing some old favourites again.

You are in control of the shuttle Discovery on its 101st mission and your target is an orbiting satellite 210 nautical miles above the Earth.

Your mission is to launch, rendezvous with the satellite and return safely to Earth as many times as you can using minimum fuel.

There is one snag – every time you dock with the satellite its orbital path becomes more and more erratic. Your success in coping with this aberration is evaluated at the end of your mission.

There are three levels to pursue: The first is Autosimulator, where the shuttle flies practically by itself, and all you have to do is dock with the satellite.

The second is Simulator, which is a simulation of the flight controlled by you and the computer. Here you have to use most of the available keyboard commands and life turns out not to be quite the bed of roses you thought.

Finally STS 101 is a fully fledged shuttle flight where every key command is available to you, and you have the ability to abort all functions when and where you like.

This level is for fast thinkers with 12 pairs of hands, qualified NASA astronauts, *Atari User* reviewers or lunatics.

Your flight begins with the launch. You have to activate the engines and ignite them at the right time or the mission will be aborted.

After a successful lift off you must keep the engines at the right power – the computer displays the exact amount of thrust to use – and follow the digital course readout.

Once in space you have to stabilise orbit by opening the cargo bay doors and adjust your position so you have visual contact with Earth. This is achieved by setting your nose down.

Once a stable orbit is achieved you have to match your speed, relative position – X, Y and Z axes – and successfully rendezvous with the satellite.

All this involves major keyboard use, major joystick use and constant reading of the instructions so that you know what are doing.

Once all this insanity is complete you must turn the shuttle around, fire the engines and decelerate to leave orbit. Don't forget to close the cargo bay doors and set the correct pitch and course for re-entry.

At last, the landing! The pitch must still be at the correct setting and tight turns must be made to keep the shuttle on course.

Once sonic booms have been made by your shuttle and the chase planes, the shuttle becomes a glider. Before you reach the runway you must deploy the landing gear. Once the wheels touch, keep the nose down and slow to a stop. That wasn't too difficult was it?

When landing is complete, the computer displays a numeric value showing what mistakes you made or, if you didn't make any – which seems extremely unlikely – the number of dockings you successfully accomplished. For a title that was released four years ago, I'd say this has done very well indeed.



On the negative side there are too many commands to handle at once. I know it's supposed to be a shuttle, but this is going a bit too far.

Also the evaluation messages at the end of your mission could have been written on screen rather than you having to resort to the instructions for enlightenment.

Talking of the instructions, the acronyms are a nuisance, as you have to keep looking up what TAEM means while burning up in re-entry!

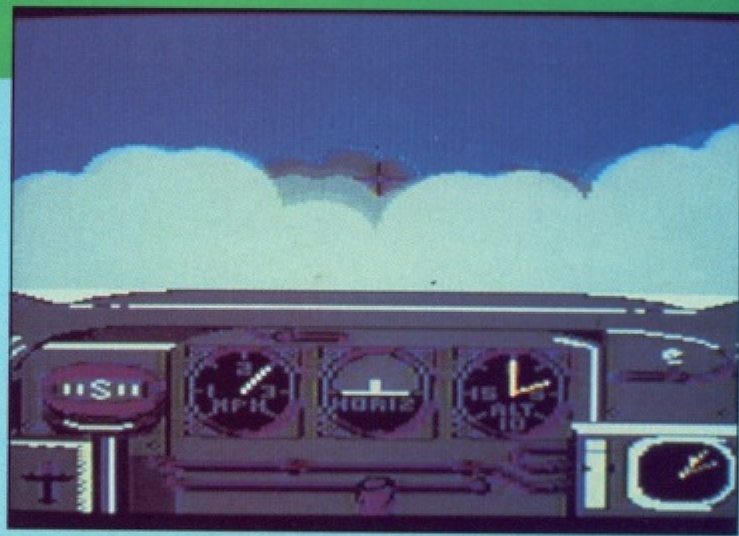
Apart from some bad points Space Shuttle performs well. The graphics aren't mind-shattering, and the sound limited to rumbles and bangs, but it is enjoyable and at a very good price.

Robert Swan

Graphics	*6*
Sound	*4*
Playability	*4*
Value for money	*7*
Overall	*6*

Software Scene

Strictly for aces



Product: Ace of Aces
Price: £9.99
Supplier: SSI/US Gold, Units 2/3, Holford Way, Holford, Birmingham BS 7AX.
Tel: 021-356 3388

CHOCS away Ginger, and it's out into the wide blue yonder blasting the odd German ME109 fighter as we play Ace of Aces, the new World War II flight simulator from Accolade – an American company which trades in Britain through US Gold.

After the initial loading sequence you are presented with a very attractive title screen and the strains of Land of Hope and Glory with machine-gun fire accompaniment.

In the nicely animated briefing room you are faced with the choice of a real mission or a practice flight.

This is indicated by the Group Captain pointing at a board with a stick. Using the joystick you move the stick to your selection and press fire to make your choice.

The practice option offers you dogfight, train or U-boat – and I strongly recommend it to enable you to become accustomed to the controls.

Mission offers you the choice of train, U-boat, V-1 bombs or bombers. After you have chosen you will receive your intelligence report which will give you details of your target, the weather, recommended weapons you will need and your orders.

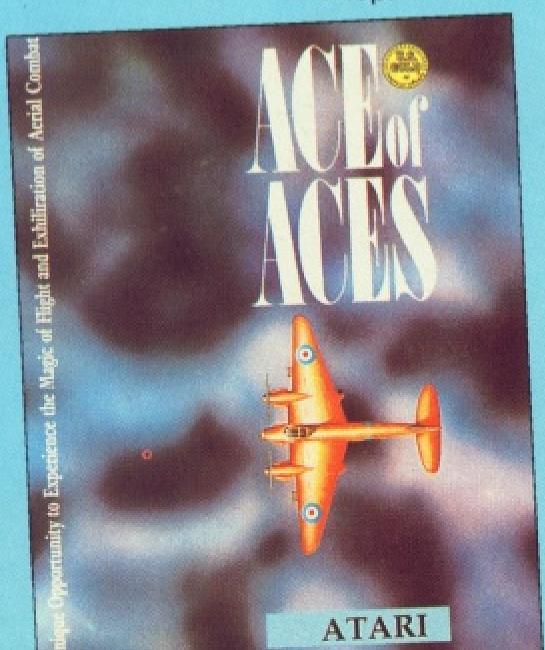
Once these have been taken in you go on to take a look at a map of England and France which shows your location – mid-Channel – the position of the your target and all major cities.

After this you must load up your Mosquito maverick fighter with bombs, rockets, fuel and cannon shells and prepare to take off.

This is indicated by a series of black and white freeze-frame photos of a klaxon, running feet (presumably yours), the propellor whirring away, the chocs being pulled away and then you waving goodbye from the cockpit. This very original idea adds considerably to the atmosphere.

Next comes another boring loading sequence, which when you have a tape version is exceptionally tedious.

Finally, after nearly 25 minutes, you get airborne. The game uses a split screen with the view from the cockpit showing white clouds rolling in the wind at the top.



Your instrument panel is shown at the bottom and indicates airspeed, radar, compass, altitude and artificial horizon. A nice feature is that as you move your joystick, the stick displayed on-screen moves too.

If at any point during the game you double click the fire button the screen will switch between the pilot's, engineers or bombadier's view of the aircraft. Using the same technique you can also view the map you saw early on.

Unfortunately, this way of selecting views can pose some problems. When in a dog fight with a German plane it is very easy to double click the fire button at the wrong time.

As you look bewildered, at these unwanted views or at the status screen – brought up by pressing the spacebar – the Germans can still fire at you and you can do nothing about it.

Also some joysticks have difficulty responding to the double click, so it would have been better if Accolade had the keyboard controlling this function.

I found this a very hard, if not impossible game to play as no indication of your status is available to you without viewing the appropriate screen.

Accolade could have at least displayed a short message when your plane catches fire or your navigator gets killed.

Having said this the graphice are excellent. There is a wide variety of styles, from cartoon figures in the briefing room to the still-frame photographs as you prepare to take off.

It's a shame that such a potentially good game has been spoiled by a poor choice of controls.

There is a nice use of sound throughout ranging from Land of Hope and Glory to the Last Post when you die, and the sound of klaxons when you take off is nicely implemented.

Overall I found it very frustrating. The loading time from tape is ridiculous – far too long to sustain interest. And when you finally start flying you can't really last very long against an enemy who can fire at you while you can't fire at him.

However, the game shows potential and it is always nice to see American software in Britain. It would be good to have more transatlantic games made available.

As simulators go, Ace of Aces is one of the best I have seen and definately up there with the leaders.

If you have the patience of a saint and a very low blood pressure this is the game for you. All said and done it is well worth the price.

Ruth James

Sound	7
Graphics	9
Playability	6
Value for money	8
Overall	8

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5 LINERS



FONT LOADER
from Gary Hudson

THIS short program contains two machine code routines. One loads a font into memory and the other re-installs the character set if you accidentally press System Reset.

To use it all you have to do is change FONT.SET in line 20 to the name of the new set you wish to load. The routines contained within this program can easily be removed and used in your own programs.

PROGRAM BREAKDOWN

10	Lowers the top of memory and pokes in the machine code
20	Opens a channel to the disc file containing the font
30	Reads in data from the disc and re-installs Reset protection
40	Machine code load routine
50	Machine code jumped to when Reset is pressed

VARIABLES

MEM	Holds the current top of Basic memory
X, Y	Used to poke in the data

```
10 MEM=PEEK(106)-8:POKE 106,MEM:POKE 2
04,MEM:GRAPHICS 0:FOR Y=0 TO 38:READ X
:POKE 1536+Y,X:NEXT Y
20 OPEN #1,4,0,"D:FONT.SET":IF PEEK(12
)<>33 THEN POKE 205,PEEK(12):POKE 206,
PEEK(13)
30 Q=USR(1536):CLOSE #1:POKE 2,PEEK(20
5):POKE 3,PEEK(206):POKE 12,33:POKE 13
,6:POKE 9,3:POKE 756,MEM
40 DATA 104,162,16,169,7,157,66,3,169,
0,157,68,3,165,106,157,69,3,169,0,157,
72,3,169,8,157,73,3,32,86,228,96
50 DATA 104,165,204,141,244,2,96
```

Get it right!

```
10 W7G (L)
20 VYH (E)
30 CA1 (E)
40 EOP (K)
50 J26 (5)
```

LEGGIT
from Eric Liddell

THERE you are, out walking and having a lovely time when suddenly you hear a tremendous bang. When you look up you see a nearby volcano starting to erupt.

Huge pieces of rock and ash are flung into the air and you must dodge them in an attempt to get to the safety of a nearby cave represented by a green square at the bottom-right corner of the screen.

This is a simple but very addictive joystick controlled game. The positions of the falling rocks are totally random, and if one lands on you it will give you quite a headache. If you don't make it to the cave, simply press a key for another game.

VARIABLES

X, Y	Horizontal and vertical position of the player
DX, DY	Horizontal and vertical direction of player
A, B	Random positions of the falling rocks

```
10 GRAPHICS 5:COLOR 3:PLOT 0,0:DRAWTO
79,0:DRAWTO 79,39:DRAWTO 0,39:DRAWTO 0
,0:X=1:Y=1:DX=1:COLOR 2:PLOT 77,37
20 A=INT(RND(0)*77)+1:B=INT(RND(0)*37)
+1:COLOR 3:PLOT A,B:S=STICK(0):DX=(S=5
 OR S=6 OR S=7)-(S=9 OR S=10 OR S=11)
30 DY=(S=13)-(S=14):LOCATE X+DX,Y+DY,Z
:IF Z=3 THEN GRAPHICS 0:POKE 752,1:POS
ITION 12,11:? "TOO BAD. YOU DIED.":END

40 IF Z=2 THEN GRAPHICS 0:POSITION 14,
11:POKE 752,1:? "YOU MADE IT !":OPEN #
1,4,0,"K:":GET #1,K:CLOSE #1:RUN
50 X=X+DX:Y=Y+DY:COLOR 1:PLOT X,Y:SOUN
D 0,100,6,15:SOUND 0,0,0,0:GOTO 20
```

Get it right!

```
10 FCE (E)
20 SU8 (5)
30 JQQ (N)
40 R9K (N)
50 DNW (Y)
```

JARGON
from Eric Liddell

ONE of the most amusing programs you can write for your computer is what is known as a buzz-word generator, and that's precisely what Jargon is. It will randomly string together two words to give you some *computer speek*. Any words can be placed in the data statements to produce your own jargon.

Some examples of computer jargon using the default data

Micro registers	Program oriented
Software display	Micro media
Micro friendly	User registers

VARIABLES

A$ Reserves space to read the words from the data into this string

A A random number to tell the computer how many words to read before printing the word

Get it right!

```
10 JQG (M)
20 CE2 (P)
30 Q1V (O)
40 TMF (5)
50 7NJ (5)
```

```
10 DIM A$(20):GRAPHICS 0:POKE 752,1:PO
KE 710,0:POSITION 9,0:? "JARGON PHRASE
 GENERATOR":?
20 RESTORE :A=INT(RND(0)*12)+1:FOR I=1
 TO A:READ A$:NEXT I:? A$;:RESTORE 50:
A=INT(RND(0)*13)+1
30 FOR I=1 TO A:READ A$:NEXT I:? A$:?
:OPEN #1,4,0,"K:":GET #1,K:CLOSE #1:GO
TO 20
40 DATA USER ,ROBOT ,MACHINE ,PROGRAM
,LANGUAGE ,SOFTWARE ,HARDWARE ,STORAGE
 ,MEMORY ,MICRO ,CPU ,CHIP ,A
50 DATA FRIENDLY,SPECIFIC,ORIENTED,ACC
ESS,MEDIA,ROM,RAM,DISPLAY,REGISTERS,DI
SKS,COMPUTERS,CODE,INTELLIGENCE
```



GTIA TEXT
from Andrei Ellman

ONE of the problems with Graphics Mode 11 is that it has no text window, which can be frustrating at times. This program starts with a Mode 8 screen, pokes location 623 with 192 and then pokes location 87 with 11 to make the computer think that it is in Mode 11.

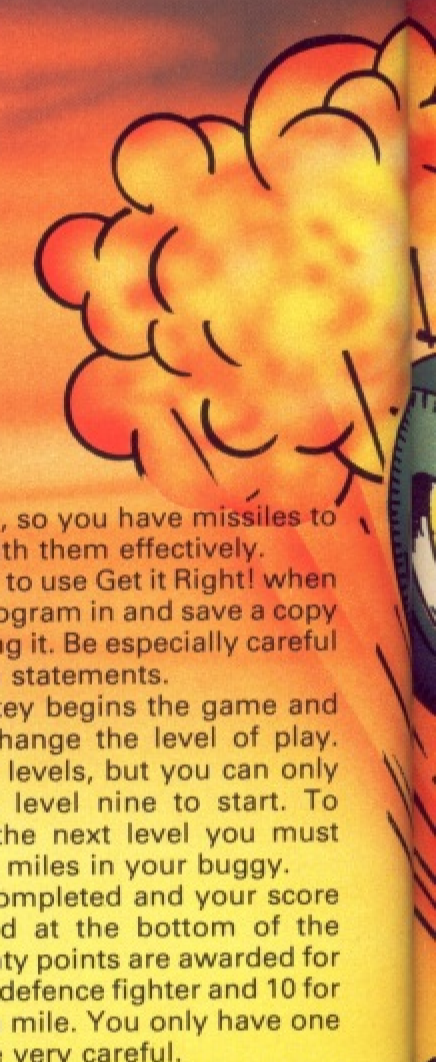
A Display List Interrupt is also set up in the text window. Once all this is done the program draws a picture using 16 colours to show you that you are in a GTIA mode.

Get it right!

```
10 DQ5 (R)
20 ASA (M)
30 T9S (M)
40 U64 (U)
50 ESV (4)
```

```
10 GRAPHICS 8:FOR I=0 TO 19:READ C:POK
E 1536+I,C:NEXT I:POKE 623,192:POKE 51
2,0:POKE 513,6:POKE 87,11:POKE 712,6
20 DL=PEEK(560)+256*PEEK(561):POKE DL+
166,143:POKE 54286,192:FOR SD=0 TO 4:F
OR T=1 TO 15:COLOR T
30 PLOT T+(SD*15)-1,0:DRAWTO T+(SD*15)
-1,159:NEXT T:NEXT SD:GM=74:FOR T=0 TO
 9:FOR A=1 TO 15:COLOR A
40 PLOT GM,A+(T*15)-1:DRAWTO 79,A+(T*1
5)-1:GM=GM-0.4:NEXT A:NEXT T:COLOR 3:F
OR T=150 TO 159:G=G+1:COLOR G
50 PLOT GM,T:DRAWTO 79,T:GM=GM-1:NEXT
T:DATA 72,138,72,169,0,162,0,141,10,21
2,141,27,208,141,26,208,104,170,104,64
```

Tyrants of Torment



GAVIN DAVIDSON puts you in control of a hi-tech buggy to try and save the world from total destruction by evil

IT is the year 2521 and mankind is in dire straits. After the *Great Destruction* control of the world was seized by evil dictators. This catastrophy was detailed many years after in the Book of Wisdom.

Apparently Arthur Endit, a high ranking Pentagon officer, phoned the President to say he was coming over for some coffee and buns. Due to interference on the telephone line the President misinterpreted and thought he said: "The commies have begun to bomb", which is when the Great Destruction began.

All but a handful of resistance fighters have survived death at the hands of the tyrants. Now the time has come for someone to undertake an almost suicidal mission to overpower them. A super hi-tech buggy equipped with all the latest weapon systems has been put at the disposal of some brave soul. Right – you are elected.

The approach to the tyrants' stronghold has been strewn with mines, so your buggy has been equipped with a suspension system that allows you to jump over them. Kamikaze defence fighters constantly buzz the area, so you have missiles to try to deal with them effectively.

Remember to use Get it Right! when typing the program in and save a copy before running it. Be especially careful with the data statements.

The Start key begins the game and Select will change the level of play. There are 21 levels, but you can only select up to level nine to start. To advance to the next level you must complete six miles in your buggy.

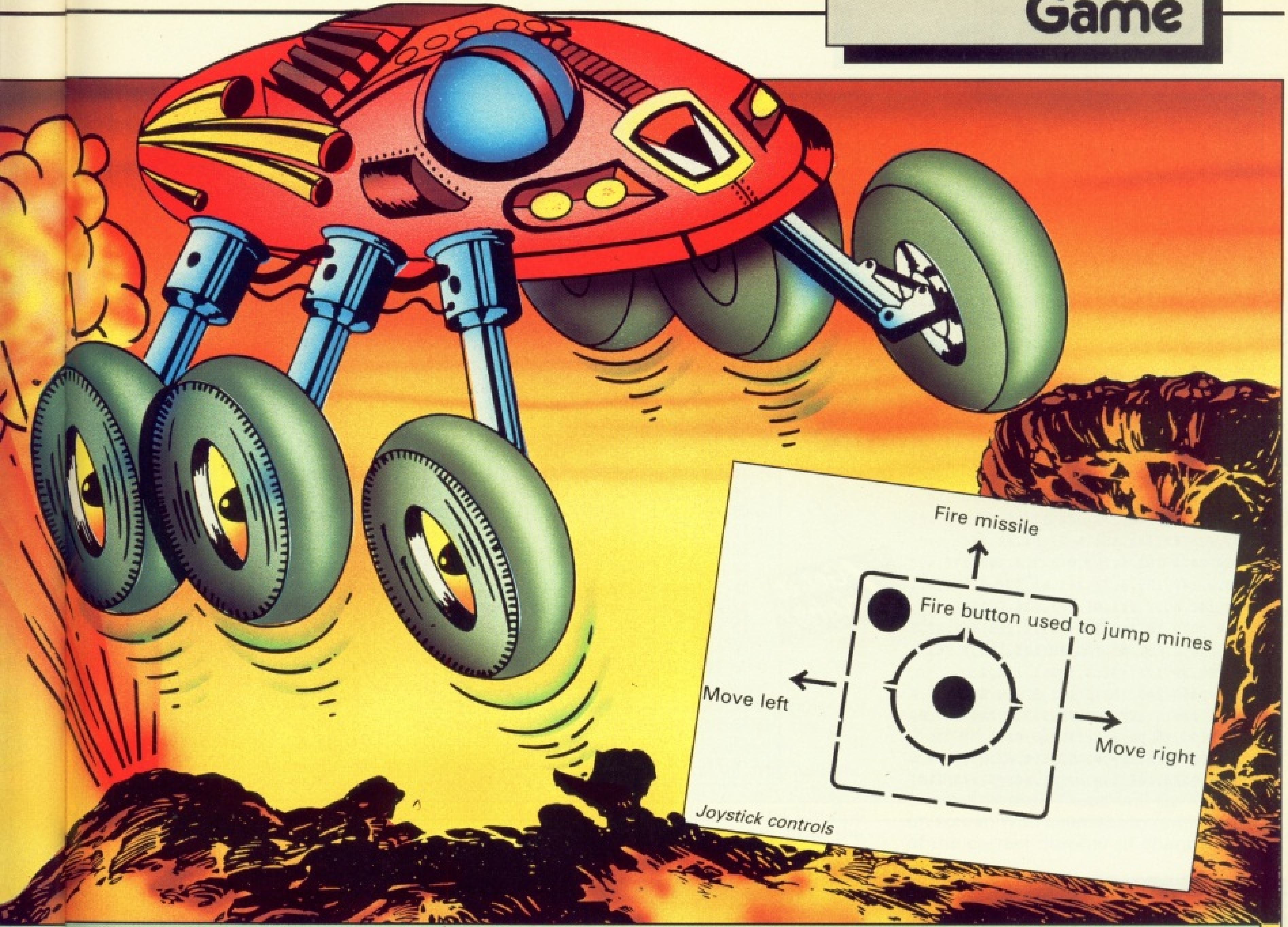
Distance completed and your score are displayed at the bottom of the screen. Twenty points are awarded for destroying a defence fighter and 10 for completing a mile. You only have one buggy, so be very careful.

The panel opposite shows all the controls, so on with the salvation of the world – it's up to you now.

PROGRAM BREAKDOWN

90-120	Configure the Display List for the screen
130-160	Draw the mountains using sine and cosine curves
170-180	Display List Interrupt used to put eight shades of colour on the screen
190-230	Redefine custom characters
250	Machine code subroutine used for the main game loop
270-300	Level select routine – if line 290 is removed you can select any of the 21 levels to play
360-460	Routine to change the difficulty level
510-520	Buggy destroyed routine
530-550	Completed level routine
500	Machine code data for the main game loop

```
10 REM **********************
20 REM * TYRANTS OF TORMENT *
30 REM *         BY         *
40 REM *   GAVIN DAVIDSON   *
50 REM *   (c) ATARI USER   *
60 REM **********************
70 GRAPHICS 0:POKE 752,1:? "    PLEASE
 WAIT FOR 50 SECONDS"
80 FOR T=0 TO 1000:NEXT T
90 GRAPHICS 7:DEG :POKE 710,10:POKE 70
8,52:POKE 709,54:POKE 559,0:POKE 711,2
10
100 DL=PEEK(560)+256*PEEK(561):POKE DL
+4,96:POKE DL+5,144
110 FOR GR0=28 TO 49:READ TEXT:POKE DL
+GR0,TEXT:NEXT GR0
120 DATA 141,141,13,141,134,6,134,6,6,
134,5,6,134,6,6,149,7,6,6,65,32,156
130 FOR X=200 TO 638 STEP 4:T=1:DX=SIN
(X):GOSUB 580
140 NEXT X
150 FOR X=5 TO 790 STEP 5:T=2:DX=COS(X
):GOSUB 580
160 NEXT X
170 FOR SUNSET=0 TO 27:READ TEXT:POKE
1536+SUNSET,TEXT:NEXT SUNSET:POKE 512,
0:POKE 513,6:POKE 54286,192
180 DATA 72,173,200,2,208,5,169,240,14
1,200,2,238,200,2,238,200,2,173,200,2,
141,10,212,141,26,208,104,64
190 J=(PEEK(742))*256-512
200 FOR Y=128 TO 464:POKE J+Y-256,PEEK
(57344+Y):NEXT Y:POKE 756,J/256
210 FOR Y=24 TO 55:READ TEXT:POKE J+Y-
256,TEXT:NEXT Y
220 DATA 85,85,85,151,171,174,234,170,
85,85,85,214,174,234,171,170
230 DATA 0,0,0,130,235,186,170,174,0,0
,0,2,170,174,170,234
240 POKE 89,148:POKE 88,152:POKE 752,1
:POKE 87,0
250 FOR Y=0 TO 761:READ T:POKE 20480+Y
,T:NEXT Y
260 POKE 559,46:POSITION 1,0:? #6;"TYR
ANTS OF TORMENT                by":? #6;" GA
VIN DAVIDSON":SKILL=1
270 POSITION 7,4:? #6;"LEVEL:";INT(SKI
LL)
280 IF PEEK(53279)=5 THEN SKILL=SKILL+
0.08
290 IF SKILL>9.9 THEN SKILL=1
300 IF PEEK(53279)<>6 THEN 270
310 ? #6;"K":POKE 559,0:POSITION 8,7:?
 #6;"POINTS:00000"
```




```
320 POSITION 21,7:? #6;"MILES:0":SOUND
 0,0,0,0:FOR Y=0 TO 43:POKE 38280+Y,5+
RND(0)*1:NEXT Y
330 POSITION 7,8:? #6;" ATARI USER:APR
IL 88":POKE 77,0
340 FOR Y=1664 TO 1684:POKE Y,0:NEXT Y
350 POKE 1664,6:POKE 1665,6:POKE 1670,
82:POKE 1672,82:POKE 53260,170:POKE 53
254,0:POKE 53255,0
360 SPEED=4:DISTANCE=24.5:R=0:T=0
370 SPEED=SPEED-0.25:DISTANCE=DISTANCE
-0.5:R=R+1:T=T+1
380 IF R=4 OR R=1 THEN R=1:SPEED=SPEED
-0.25:POKE 53260,170
390 IF R=1 THEN POKE 1684,1
400 IF R=2 OR DISTANCE<14 THEN POKE 16
84,0
410 IF R=3 OR DISTANCE<14 THEN POKE 53
260,90
420 IF T<>INT(SKILL) THEN GOTO 370
430 IF SPEED<1 THEN SPEED=1
440 IF DISTANCE<14 THEN DISTANCE=14
450 IF T<>INT(SKILL) THEN GOTO 370
460 POKE 1682,INT(SPEED):POKE 1683,INT
(DISTANCE)
470 POKE 54279,64:POKE 53277,3:POKE 62
3,49:POKE 559,46:POKE 704,122:POKE 705
,4
480 POKE 53256,1:POKE 53257,1
490 X=USR(21110)
500 IF PEEK(1681)=1 THEN GOTO 530
510 FOR R=240 TO 0 STEP -10:SOUND 0,RN
D(0)*255,0,R/18:POKE 704,R+15:POKE 705
,R+15:NEXT R
520 GOTO 260
530 IF DISTANCE=14 THEN GOTO 550
540 SKILL=SKILL+1
550 POSITION 7,2:? #6;"LEVEL:";INT(SKI
LL)
560 FOR R=0 TO 15:FOR T=0 TO 255 STEP
10:SOUND 0,T,10,R:NEXT T:NEXT R
570 POSITION 7,2:? #6;"        ":POKE
559,0:GOTO 320
580 COLOR T:PLOT X/(T+3),16+DX*(T+2)+R
ND(0)*T:DRAWTO X/(T+3),22:RETURN
590 DATA 0,32,8,120,120,248,124,255,12
8,126,126,0,0,0,0,32,0,116,6,135,7,131
,0,126,171,213,126,0,213,171,213
600 DATA 0,66,231,255,231,66,0,0,0,0,8
,28,42,127,42,28,8,0,0,240,144,240,0,1
62,100,142,132,6,32,156,80,169
610 DATA 64,133,204,169,0,168,133,203,
145,203,200,208,251,230,204,166,204,22
4,69,208,243,172,134,6,162,0,189
620 DATA 0,80,153,0,66,189,14,80,153,1
27,66,232,200,224,14,208,238,162,0,172
,138,6,189,31,80,153,0,67,189
630 DATA 40,80,153,133,67,200,232,224,
9,208,238,162,0,172,140,6,189,49,80,15
3,160,65,200,232,224,5,208,244
640 DATA 173,141,6,105,40,141,7,208,96
,142,0,208,142,1,208,96,173,128,6,141,
4,212,206,128,6,208,237,162,0
650 DATA 173,133,6,208,25,238,131,6,17
2,131,6,185,27,80,141,219,66,185,28,80
,141,220,66,192,2,208,3,142,131
660 DATA 6,189,137,149,157,136,149,232
,224,43,208,245,32,235,81,105,4,157,13
6,149,238,129,6,173,129,6,205
670 DATA 147,6,144,45,173,130,6,208,13
```

VARIABLES

SPEED	Decides the speed of the game
DISTANCE	Decides the least amount of space there can be between mines

Turn to Page 40 ►

◀ From Page 39

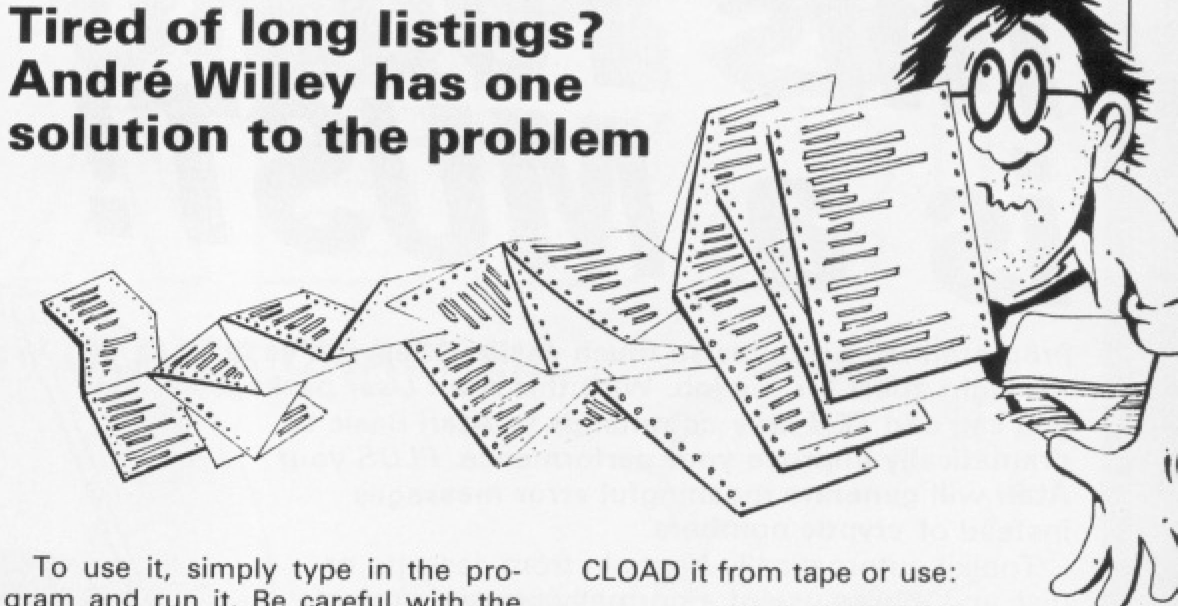
```
,32,235,81,240,30,32,235,81,105,1,141,
130,6,32,235,81,105,3,157,136
680 DATA 149,206,130,6,173,130,6,208,1
1,141,129,6,76,25,81,169,10,141,129,6,
169,5,141,128,6,76,163,80,238
690 DATA 133,6,173,133,6,201,4,144,11,
201,10,176,7,238,135,6,224,4,208,36,16
0,0,140,135,6,173,133,6,201,13
700 DATA 240,16,201,7,176,6,206,134,6,
76,84,80,238,134,6,76,84,80,140,133,6,
169,82,141,134,6,96,174,135,6
710 DATA 208,207,173,133,6,208,188,173
,132,2,240,183,174,132,6,173,120,2,201
,11,240,5,201,7,240,11,96,224
720 DATA 48,240,251,206,132,6,76,156,8
0,224,191,240,241,238,132,6,76,156,80,
32,220,81,141,136,6,32,94,82,96
730 DATA 162,0,169,0,172,8,208,192,4,2
08,6,142,139,6,32,141,81,192,8,208,6,1
42,142,6,32,141,81,173,136,6,208
740 DATA 10,169,160,141,1,210,169,82,1
41,136,6,201,82,208,15,173,120,2,201,1
4,208,36,173,132,6,105,3,141,4
750 DATA 208,169,3,141,1,210,206,136,6
,174,136,6,157,128,65,142,0,210,169,0,
157,129,65,96,173,10,210,41,1
760 DATA 96,169,0,153,160,65,200,192,6
9,208,248,141,140,6,141,141,6,173,148,
6,208,31,172,140,6,192,59,240
770 DATA 228,192,0,208,14,238,141,6,17
2,141,6,140,6,208,204,132,6,144,6,238,
140,6,206,141,6,32,235,81,109
780 DATA 139,6,141,2,208,141,139,6,172
,137,6,208,10,173,138,6,238,138,6,201,
82,144,18,192,60,240,9,238,137
790 DATA 6,206,138,6,76,82,82,169,0,14
1,137,6,206,142,6,173,142,6,141,3,208,
76,107,80,162,3,238,194,149,189
800 DATA 191,149,201,26,208,11,169,16,
157,191,149,202,254,191,149,208,238,96
,32,54,80,173,28,2,208,15,173
810 DATA 146,6,141,28,2,32,163,80,32,9
1,81,32,1,82,173,30,2,208,63,169,1,141
,30,2,238,194,2,238,195,2,32,151
820 DATA 81,32,151,81,169,0,141,30,208
,238,143,6,173,143,6,201,50,208,31,162
,0,142,143,6,238,144,6,173,144
830 DATA 6,201,10,208,16,142,144,6,32,
94,82,238,203,149,173,203,149,201,23,2
40,36,173,14,208,201,3,240,32
840 DATA 173,15,208,201,3,240,25,173,4
,208,208,20,173,11,208,201,3,240,13,17
3,10,208,201,3,240,6,76,121,82
850 DATA 238,145,6,104,96
```

Get it right!

```
 10 CP1 (Y)   180 VM2 (K)   350 78A (P)   520 QNC (N)   690 53X (N)
 20 CP2 (3)   190 8W1 (T)   360 WTE (7)   530 OAO (F)   700 OX8 (V)
 30 CP3 (X)   200 WK8 (V)   370 GVV (U)   540 X8D (M)   710 O8W (R)
 40 CP4 (4)   210 AO8 (2)   380 A8K (3)   550 HC7 (N)   720 CQ6 (1)
 50 CP5 (Y)   220 8US (Q)   390 ML8 (P)   560 MQU (6)   730 E5S (1)
 60 CP6 (7)   230 UKR (9)   400 GKC (1)   570 X4O (H)   740 41P (M)
 70 LHE (6)   240 QTK (8)   410 ME3 (8)   580 2EA (K)   750 YKW (Q)
 80 76N (2)   250 SNW (F)   420 1JH (6)   590 CAN (L)   760 YYQ (5)
 90 EEQ (Y)   260 MAA (G)   430 RSM (9)   600 3ND (C)   770 WNX (A)
100 47W (E)   270 HL8 (4)   440 AOJ (6)   610 827 (8)   780 7PT (5)
110 6LX (3)   280 HDQ (9)   450 1WH (C)   620 O9J (W)   790 CXS (G)
120 DXQ (W)   290 39H (V)   460 W2J (2)   630 5LX (C)   800 XAH (7)
130 OYC (A)   300 Q74 (W)   470 GC5 (4)   640 YDP (6)   810 86X (6)
140 QU1 (2)   310 1S4 (2)   480 SGT (O)   650 9OC (F)   820 6DF (J)
150 VX5 (P)   320 57Y (U)   490 RNK (U)   660 OQ6 (F)   830 14R (Y)
160 R31 (Y)   330 8A2 (5)   500 VGG (M)   670 XFU (L)   840 6ND (V)
170 MVO (7)   340 7XM (D)   510 LTQ (2)   680 X7F (T)   850 5UR (4)
```

Checksum Buster

Tired of long listings? André Willey has one solution to the problem



MANY of you have written in praising our new Get It Right! II checksum program, and one reader from Berkshire added a comment which set us thinking.

If each line can generate its own unique checksum, why is it not possible to reverse the process and regenerate the original line from the special checksum value? After all, the four checksum bytes exactly represent the original line, don't they?

After some thought we can now bring you a program which at least goes part way to solving this problem. Since Atari Basic uses a small number of fixed tokens to make up all its lines, it is quite possible to re-generate a program except for the contents of strings, DATA statements and REM statements. These could obviously contain any text and since they are processed separately by GIR! in any case (see my source code listing and flowchart in the November 1987 issue of *Atari User* 1987 for information) there just isn't enough information to recreate them reliably.

However, everything else can be generated from just the four byte checksum, so once you have created the final program file you should load it into memory and correct the string and data contents from the full listing – REMs may safely be ignored. You should make sure that the normal GIR! tape or disc was loaded when you turned on the computer because this new program will access some of its internal machine code routines to save time and space.

To use it, simply type in the program and run it. Be careful with the DATA statements because they contain machine code to access the Basic rom which might crash the computer if mis-typed. When you run the program you will be asked to enter checksum values one by one, and you should hit Return on its own to finish. To start with try entering just the first 10 or 20 checksums to see how the system works before going on to attempting a full program.

You should then enter a filename to save the newly generated program – C: for cassette or D:FILENAME.BAS for disc. Once the program has finished writing you should rewind and CLOAD it from tape or use:

```
LOAD "D:FILENAME.BAS"
```

for disc.

The original program will now be almost complete in memory. All that is then left to do is to LIST it and use the screen editor to complete any lines containing strings or DATA from the original listing. These will be flagged on screen with asterisks to remind you of the correct number of characters.

● *Next month, I'll show you how this program works, and other applications of the same principle. In the meantime, reading the article on tokenisation on page 9 will give you some clues.*

```
10 REM GIR II EXPANDER PROGRAM
20 REM WRITTEN BY ANDRE WILLEY
30 REM (C) ATARI USER, APRIL 1988
40 REM
50 MAX=FRE(0)-1000
60 DIM MCODE$(500),GIR$(MAX),FILE$(20)
,INP$(10)
70 CURR=1
80 GOSUB 410
90 POSITION 2,9:? "Enter each GIR II c
ode on a new line":? "       using the
 format ABC X"
100 ? :? "then press RETURN twice to s
ave file":? :?
110 ? "ENTER CODE: ";
120 INPUT #16;INP$
130 IF INP$="" THEN 230
140 IF LEN(INP$)<4 OR LEN(INP$)>5 THEN
 220
150 FOR I=1 TO LEN(INP$)
160 IF I=4 AND INP$(I,I)=" " AND LEN(I
NP$)=5 THEN 180
170 IF INP$(I)<"0" OR INP$(I)>"Z" OR (
INP$(I)>"9" AND INP$(I)<"A") THEN POP
:GOTO 220
180 NEXT I
190 GIR$(CURR,CURR+4)=INP$:CURR=CURR+5
200 IF LEN(GIR$)>MAX-10 THEN 230
210 GOTO 110
220 ? CHR$(253);"ERROR: RE-";:GOTO 110
230 REM FINISHED ENTERING DATA
240 GOSUB 410:IF LEN(GIR$)>=(MAX-10) T
HEN POSITION 2,7:? " *** MEMORY FULL:-
 TIME TO SAVE ***"
250 POSITION 2,10:? " Give full filesp
ec to save prog to":? "     (Eg: 'D:PR
OG.BAS' or 'C:')":?
260 ? "Enter filename: ";:INPUT #16,FI
LE$
270 CHAN=1:CLOSE #CHAN:TRAP 280:OPEN #
CHAN,8,128,FILE$:TRAP 40000:GOTO 290
280 ? CHR$(253);"ERROR: Re-";:GOTO 260
290 ? :? .:? "OK. Saving program to ";F
ILE$
300 CURR=1
310 READ A:IF A=-1 THEN 330
320 MCODE$(CURR,CURR)=CHR$(A):CURR=CUR
R+1:GOTO 310
330 ADDR=ADR(MCODE$)
340 TEMPH=INT((ADDR+45)/256):POKE ADDR
+16,TEMPH
350 TEMPL=ADDR+45-(TEMPH*256):POKE ADD
R+11,TEMPL
360 ERR=USR(ADR(MCODE$),CHAN,ADR(GIR$)
)
370 CLOSE #CHAN:?
380 IF ERR=1 THEN ? "File completed OK
"
390 IF ERR<>1 THEN ? "ERROR: File may
be corrupt"
400 ? :? :? "DONE":END
410 GRAPHICS 0:SETCOLOR 4,9,2
420 ? "           GIR II EXPANDER"
430 ? :? "      Written by Andre Wille
y"
440 ? :? "    (c)  Atari User, April 1
988"
450 RETURN
460 DATA 104,104,104,10,10,10,10,170,1
04,104,169,255,157,68,3,169,255,157,69
,3
470 DATA 169,11,157,66,3,169,0,157,73,
3,169,226,157,72,3,32,86,228,132,212
480 DATA 169,0,133,213,96
490 DATA 0,0,0,1,109,1,110,1,142,1,191
,1,212,1,32,32,32,32,32,32
500 DATA 32,32,32,32,32,32,72,111,33,3
2,72,111,33,32,72,111,161,32,32,32
510 DATA 32,32,32,32,32,60,60,60,32,65
,80,82,73,76,32,70,79,79,76,33
520 DATA 32,62,62,190,32,89,111,117,32
,100,105,100,110,39,116,32,82,69,65,76
530 DATA 76,89,32,102,97,108,108,32,10
2,111,114,32,105,116,32,46,46,46,174,3
2
540 DATA 32,32,32,32,32,32,32,32,32,46
,46,46,46,46,32,68,73,68,32,121
550 DATA 111,117,191,0,0,0,0,0,0,0,0,0
,0,1,0,0,0,0,0,0
560 DATA 0,2,0,0,0,0,0,0,0,3,0,0,0,0,0
,0,0,0,49,49
570 DATA 54,22,22,22,22,22,22,22,22,22
,22,22,22,22,22,22,22,22,22,22
580 DATA 22,22,22,22,128,22,22,22,129,
22,22,22,22,130,22,22,22,131,22,22
590 DATA 22,22,22,22,22,0,128,21,21,25
,15,13,68,51,58,65,80,82,73,76
600 DATA 50,46,66,65,83,22,-1
```

This Toolkit is a MUST!

ATARI USER *exclusive!*



Programming becomes so much easier when you've got the right tools for the job. With this *Atari User* package you can add TEN new commands to Atari Basic to dramatically improve your performance. *PLUS* your Atari will generate meaningful error messages instead of cryptic numbers.

Toolkit automatically boots in from cassette or disc and makes use of a normally unused area of memory.

This package of stunning utilities – specially commissioned by *Atari User* – is an absolute must. It comes complete with comprehensive on-screen instructions telling you how to get the most from each of the programs.

CLICK Turns that sometimes annoying keyboard click on or off simply.

DEL Removes a single or block of unwanted Basic lines quickly.

GIR! Calculates and presents the useful *Atari User* checksums instantly.

REN Instantly renumbers your Basic programs in any line increment.

DIR Displays a directory of any drive without having to enter Dos.

VAL Converts numbers between decimal, hexadecimal and binary.

LVAR Gives the name of all used variables and a list of all their occurrences.

CHANGE Alters the name of a variable at every occurrence in a program

STRIP Removes all REMs and reduces the size of the program.

LISTING Prints and includes the Atari special characters on an Epson printer.

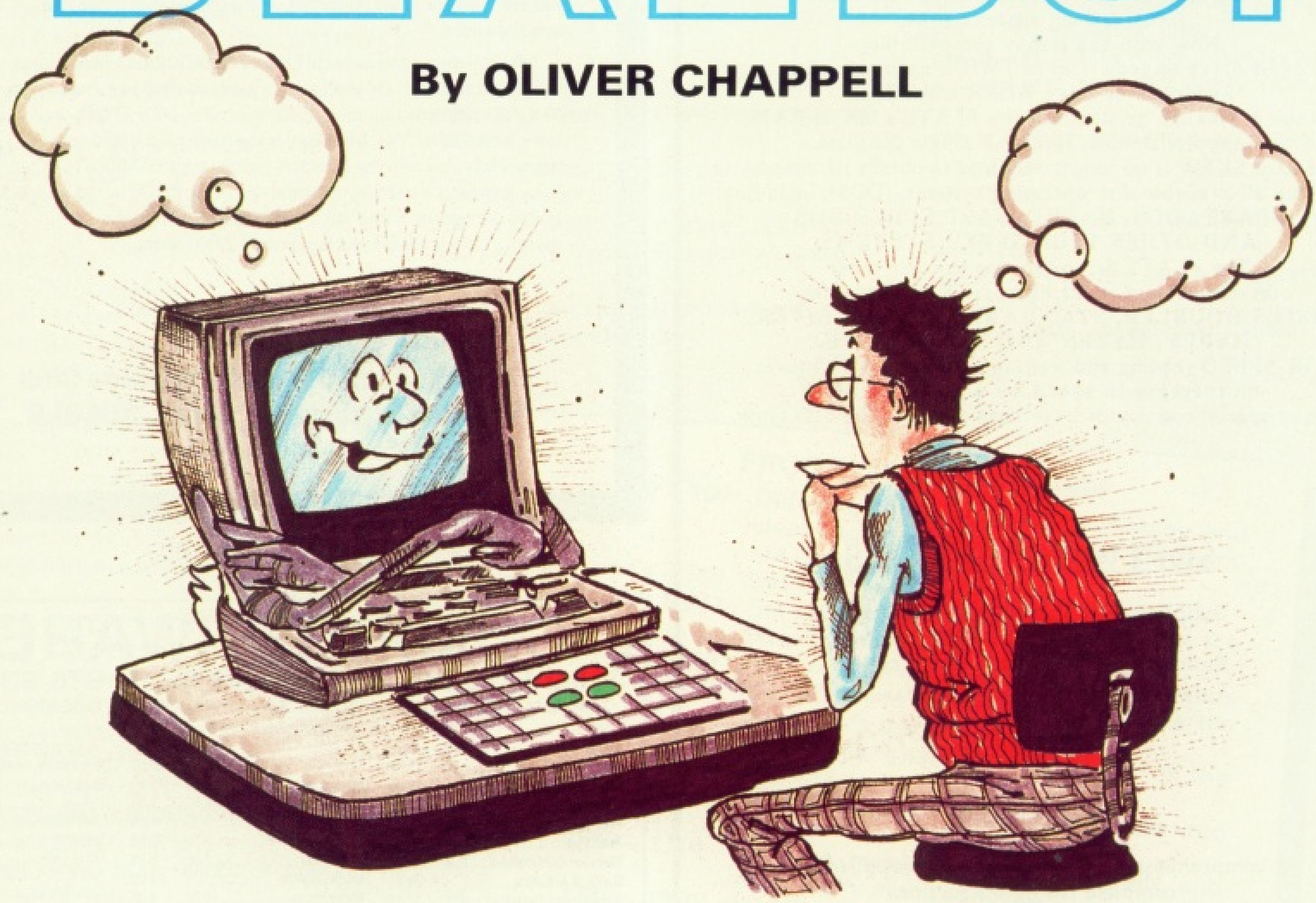
£5.95 tape
£7.95 disc

TO ORDER PLEASE USE THE FORM ON PAGE 61

REVERSI



By OLIVER CHAPPELL



THIS is an adaptation of the traditional game played on a board with 64 squares. The objective is to obtain the most counters at the end of the game – when all 64 squares are coloured in. The players, in this case you and the computer, take alternate turns to place a counter on the board. You have green counters and the computer red.

They can only be placed on the board sandwiching one or more of the computer's counters in between two of your own. They must be in a straight line – horizontally, vertically or diagonally. No counters can ever be taken off the board, and no player can have consecutive turns unless his opponent cannot move.

The game starts with four counters in the centre of the board – two for each player – and the game expands from there. It is worth noting that counters in the centre of the board are not much of an asset as they can be easily surrounded and recaptured.

It is therefore advisable to have edge pieces, and an even more distinct advantage to secure the corners, as these can't be altered. Having said that there is only one way to perfect your play – practice.

To place your counter all you do when the *YOUR MOVE* prompt appears is press the keys 1 to 8 twice: First for the vertical coordinate and then for the horizontal one. The computer will record the move on the screen and turn over all the necessary counters.

There are, at your disposal, several functions which can either help, pass your move over to the computer or even cheat.

Firstly there is *Help*, which after a few seconds will give you the coordinate which will allow you to take the most counters on the board. Secondly comes *Swap* which changes all the computer's counters into yours and vice versa by reversing the colours. This is a useful feature if you are in a sticky position.

Pass allows you to pass your move over to the computer. This must be used if you can't go, but at times it can be to your advantage. You can also quit at any stage or use the *Judge* function which will assess the state of play at any time by giving a percentage result as to who is in the stronger position.

The game ends when all the positions on the board are occupied or either player has no counters left and is therefore unable to win.

Remember to use Get it Right! when you type the program in and be extra careful with the data statements: They are part of a short machine code routine and could crash the computer if entered incorrectly.

Turn to Page 45 ▶

◀ From Page 43

```
1 REM ********************
2 REM *     REVERSI      *
3 REM *       BY         *
4 REM * OLIVER CHAPPELL *
5 REM *  (c)ATARI USER  *
6 REM ********************
10 SETCOLOR 2,0,0:SETCOLOR 1,0,12:SETC
OLOR 4,9,4:POKE 752,1:? "K":? "Enterin
g M/Code..."
20 REM *****  DEFINE VARIABLES  *****
30 OPEN #1,4,0,"K:"
40 DIM R$(8),M$(20):R$="12345678":DIM
AA$(340),II$(40)
50 DIM A(8):FOR R=1 TO 8:A(R)=2^(8-R):
NEXT R
60 GOSUB 1120
70 POP :FOR R=1536 TO 1616 STEP 10:FOR
 T=R TO R+8:POKE T,0:NEXT T:NEXT R
80 POKE 1580,2:POKE 1581,3:POKE 1590,3
:POKE 1591,2
90 FOR R=1536 TO 1545:POKE R,4:NEXT R:
FOR R=1626 TO 1635:POKE R,4:NEXT R:FOR
 R=1546 TO 1616 STEP 10:POKE R,4
100 POKE R+9,4:NEXT R
110 REM *****  TITLE SCREEN  *****
120 GRAPHICS 31
130 SETCOLOR 0,0,12:SETCOLOR 1,12,6:SE
TCOLOR 2,3,6
140 XC=4:YC=0:XS=1:YS=3:IN=2:M$="Prese
nting...":GOSUB 2290
150 XC=22:YC=35:XS=2:YS=8:IN=1:M$="REV
ERSI":GOSUB 2290
160 XC=10:YC=110:XS=1:YS=3:IN=3:M$="By
 Oliver Chappell":GOSUB 2290
170 XC=5:YC=165:XS=1:YS=2:IN=2:BK=1:M$
="  'Start' To Play  ":GOSUB 2290
180 X=USR(ADR(II$),255)
190 REM *****  PLAY SCREEN  *****
200 ? #6;"K":BK=0
210 FOR R=1 TO 9:COLOR 1:PLOT 14,R*19-
1:DRAWTO 100,R*19-1:NEXT R
220 FOR R=1 TO 9:COLOR 1:PLOT R*11+2,1
8:DRAWTO R*11+2,170:NEXT R
230 COLOR 2:PLOT 34,54:PLOT 36,58:PLOT
 34,58:PLOT 36,54:PLOT 78,130:PLOT 80,
130:PLOT 78,134:PLOT 80,134
240 PLOT 34,130:PLOT 34,134:PLOT 36,13
0:PLOT 36,134:PLOT 78,54:PLOT 80,54:PL
OT 78,58:PLOT 80,58:COLOR 1
250 COLOR 0:PLOT 35,56:PLOT 79,56:PLOT
 35,132:PLOT 79,132:COLOR 1
260 PLOT 111,10:DRAWTO 154,10:DRAWTO 1
54,51:DRAWTO 111,51:DRAWTO 111,10
270 PLOT 111,10:DRAWTO 116,5:DRAWTO 15
9,5:DRAWTO 154,10:PLOT 159,5:DRAWTO 15
9,46:DRAWTO 154,51
280 PLOT 111,23:DRAWTO 154,23:DRAWTO 1
59,18:PLOT 132,23:DRAWTO 132,51
290 PLOT 12,17:DRAWTO 102,17:DRAWTO 10
2,171:DRAWTO 12,171:DRAWTO 12,17
300 PLOT 111,72:DRAWTO 154,72:DRAWTO 1
54,156:DRAWTO 111,156:DRAWTO 111,72:DR
AWTO 116,67:DRAWTO 159,67
310 DRAWTO 159,151:DRAWTO 154,156:PLOT
 159,67:DRAWTO 154,72:PLOT 111,85:DRAW
TO 154,85:DRAWTO 159,80
320 DATA •FNT•,Help,Swap,Pass,Quit,Jud
ge
330 IN=1:COLOR 1:RESTORE 320:FOR R=0 T
O 5:XC=113:YS=1:XS=1:READ M$:YC=R*14+7
5:GOSUB 2290:IN=3:NEXT R
340 GOSUB 1690
350 GOSUB 1730
360 REM *****  PLAYER'S GO  *****
370 IF CMP+HUM>63 OR CMP=0 OR HUM=0 TH
EN 2320
380 XC=21:YC=175:IN=2:BK=0:XS=1:YS=1:M
$="YOUR MOVE":GOSUB 2290
390 XC=113:YC=75:M$="•FNT•":GOSUB 2290
400 XC=3:YC=0:IN=3:YS=2:M$="↓":GOSUB 2
290
410 POKE 764,255:GET #1,ROW:ROW=ROW-48
420 IF ROW=32 THEN 620
COL>8 THEN 530
540 A=USR(ADR(AA$),COL*11+4,0,2,0,1,2,
ADR(R$(COL,COL)),1)
550 R=COL:T=ROW:GOSUB 2280:IF PEEK(CO)
<>0 THEN TAK=-1:GOTO 580
560 M=ROW:N=COL:POKE CO,2
570 GOSUB 860
580 XC=21:YC=175:IN=0:BK=0:XS=1:YS=1:M
$="          ":GOSUB 2290
590 IF TAK=0 THEN R=COL:T=ROW:GOSUB 93
0:GOSUB 2280:POKE CO,0:GOSUB 2270:GOTO
 370
600 IF TAK=-1 THEN GOSUB 930:GOSUB 227
0:GOTO 370
610 GOSUB 1730
620 XC=113:YC=75:YS=1:IN=1:M$="•FNT•":
GOSUB 2290
630 YS=2:XC=3:YC=0:M$=" ":GOSUB 2290
640 GOTO 660
650 REM *****  COMPUTER GO  *****
```

PROGRAM BREAKDOWN

20 – 100	Define all the necessary variables and clear Page 6 where the data for the counters is stored
110 – 180	Set up the screen in graphics Mode 31
190 – 350	Set up the screen of play by drawing the board, score board and function box
360 – 640	Main routine for handling all player inputs
650 – 840	Machine code subroutine to calculate the computer's moves
850 – 1110	Routine to change the colours of the counters
1115 – 1670	Routine to poke machine code data into memory
1680 – 1710	Print the numbers 1 to 8 vertically and horizontally along the board
1720 – 1910	Print the board on the screen and make the sound for a red or green counter
2260 – 2270	Routine to work out an illegal move
2280 – 2380	End of game routine

```
430 IF ROW=33 THEN 70
440 IF ROW<>24 THEN 480
450 GOSUB 2390:X=USR(28000):GOSUB 2390
:IF PEEK(1734)=0 THEN M$="CANT HELP":G
OTO 470
460 M$=" Help ":M$(LEN(M$)+1)=STR$((PE
EK(1735)+11)/10)
470 XC=21:YC=175:IN=3:YS=1:GOSUB 2290:
FOR R=1 TO 220:NEXT R:GOTO 370
480 IF ROW=35 THEN GOSUB 2390:GOSUB 17
30
490 IF ROW=26 THEN GOSUB 2420
500 IF ROW<1 OR ROW>8 THEN 370
510 A=USR(ADR(AA$),3,ROW*19+1,2,0,1,2,
ADR(R$(ROW,ROW)),1)
520 M$="→":GOSUB 2290
530 GET #1,COL:COL=COL-48:IF COL<1 OR
660 IF CMP+HUM>63 OR CMP=0 OR HUM=0 TH
EN 2320
670 RTT=0:RET=0:XC=21:YC=175:IN=3:BK=0
:XS=1:YS=1:M$=" MY MOVE ":GOSUB 2290
680 FG=USR(28000)
690 IF PEEK(1734)=0 THEN M$="CANNOT GO
":GOSUB 2290:FOR R=1 TO 100:NEXT R:GOT
O 370
700 IF PEEK(1734)=0 AND RTT>1 THEN RET
=1:GOTO 680
710 HX=INT(PEEK(1735)/10)
720 HY=PEEK(1735)-(HX*10):HX=HX+1:HY=H
Y+1:T=HX:R=HY:GOSUB 2280
730 IF RET=1 THEN 790
```

Turn to Page 46 ▶

◀ From Page 45

```
740 IF HX<>HX OR (9-HX)<>HY THEN 790
750 GOSUB 1940:X=USR(28390)
760 IF PEEK(1727)=1 THEN RTT=RTT+1:POK
E 1637+PEEK(1735),0:X=USR(28260):GOTO
700
770 GOSUB 2030:X=USR(28390)
780 IF PEEK(1727)=1 THEN RTT=RTT+1:POK
E 1637+PEEK(1735),0:X=USR(28260):GOTO
700
790 GOSUB 990
800 ROW=HX:COL=HY:A=USR(ADR(AA$),COL*1
1+4,0,3,0,1,2,ADR(R$(COL,COL)),1)
810 A=USR(ADR(AA$),3,ROW*19+1,3,0,1,2,
ADR(R$(ROW,ROW)),1)
820 GOSUB 1730
830 GOSUB 930
840 GOTO 370
850 REM **** TURN OVER COUNTERS ****
860 TAK=0:FOR C=-1 TO 1:FOR D=-1 TO 1
870 F=M:G=N
880 F=F+C:G=G+D:IF F<1 OR F>8 OR G<1 O
R G>8 THEN 920
890 R=G:T=F:GOSUB 2280
900 IF PEEK(CO)=3 THEN 880
910 IF PEEK(CO)=2 THEN 960
920 NEXT D:NEXT C
930 R=ROW:A=USR(ADR(AA$),3,R*19+1,1,0,
1,2,ADR(R$(R,R)),1)
940 R=COL:A=USR(ADR(AA$),R*11+4,0,1,0,
1,2,ADR(R$(R,R)),1)
950 RETURN
960 F=M:G=N
970 F=F+C:G=G+D:R=G:T=F:GOSUB 2280:IF
PEEK(CO)=2 THEN 920
980 POKE CO,2:TAK=1:GOTO 970
990 POKE CO,3
1000 FOR C=-1 TO 1:FOR D=-1 TO 1:A=HX:
B=HY
1010 A=A+C:B=B+D:IF A<1 OR A>8 OR B<1
OR B>8 THEN 1060
1020 R=B:T=A:GOSUB 2280
1030 IF PEEK(CO)=2 THEN 1010
1040 IF PEEK(CO)=3 THEN 1080
1050 IF PEEK(CO)=0 THEN 1060
1060 NEXT D:NEXT C
1070 RETURN
1080 F=HX:G=HY
1090 F=F+C:G=G+D:R=G:T=F:GOSUB 2280:IF
 PEEK(CO)=3 THEN 1060
1100 POKE CO,3:GOTO 1090
1110 GOTO 1060
1120 RESTORE 1160
1130 FOR J=1 TO 1999:READ A:IF A=-1 TH
EN 1290
1140 AA$(J,J)=CHR$(A):NEXT J
1150 STOP
1160 DATA 169,0,141,255,6,104,201,8,24
0,14,160,1,10,170,240,4,104,202,208,25
2,140,255,6,96,160,141,104,141
1170 DATA 243,6,104,141,242,6,104,240,
4,169,13,208,228,104,141,244,6,104,104
,141,245,6,104,104,141,246,6
1180 DATA 104,240,4,169,7,208,207,104,
141,247,6,104,240,4,169,5,208,196,104,
208,5,168,169,4,208,188,141,248
1190 DATA 6,104,133,206,104,133,205,10
4,141,249,6,104,141,250,6,173,244,6,14
1,252,6,173,249,6,13,250,6,208
1200 DATA 1,96,169,255,141,251,6,173,2
50,6,56,233,1,141,250,6,176,3,206,249,
6,160,0,177,205,10,144,3,140
1210 DATA 251,6,74,201,96,176,10,201,3
2,144,4,233,32,176,2,105,64,172,244,2,
132,204,162,3,10,144,8,72,138
1220 DATA 24,101,204,133,204,104,202,2
08,242,133,203,160,0,152,72,173,242,6,
141,253,6,173,243,6,141,254,6
1230 DATA 173,252,6,141,241,6,177,203,
77,251,6,162,8,240,143,10,72,169,0,208
,221,42,168,185,245,6,141,251
1240 DATA 2,138,72,24,173,253,6,133,85
,109,247,6,141,253,6,173,254,6,133,86,
105,0,141,254,6,172,248,6,162
1250 DATA 2,189,252,6,149,90,202,16,24
8,133,84,152,72,162,96,169,17,157,66,3
,240,190,32,86,228,48,52,238
1260 DATA 252,6,104,168,136,208,220,10
4,170,104,202,240,9,172,241,6,140,252,
6,24,144,164,104,168,200,192
1270 DATA 8,208,161,230,205,208,2,230,
206,173,253,6,141,242,6,173,254,6,141,
243,6,169,0,240,197,140,255,6
1280 DATA 104,104,104,104,96,-1
```



```
1290 RESTORE 1510:FOR R=0 TO 999:READ
A:IF A=-1 THEN 1310
1300 POKE 27960+R,A:NEXT R
1310 RESTORE 1490:FOR R=1 TO 999:READ
A:IF A=-1 THEN 1330
1320 II$(R,R)=CHR$(A):NEXT R
1330 RESTORE 1480:FOR R=0 TO 999:READ
A:IF A=-1 THEN 1350
1340 POKE 1740+R,A:NEXT R
1350 RESTORE 1410:FOR R=0 TO 999:READ
A:IF A=-1 THEN 1370
1360 POKE 28500+R,A:NEXT R
1370 RESTORE 1640:FOR R=0 TO 999:READ
A:IF A=-1 THEN 1390
1380 POKE 28390+R,A:NEXT R
1390 RESTORE 2300:FOR R=0 TO 999:READ
A:IF A=-1 THEN RETURN
1400 POKE 27900+R,A:NEXT R
1410 DATA 2,61,2,4,59,2,8,55,2,16,47,2
,2,29,3,4,27,3,8,23,3,2,13,4,4,11,4,2,
5,5,32,92,7,16,108,7,8,116,7,32,88,6
1420 DATA 16,44,7,16,40,6,8,20,7,4,58,
2,8,54,2,16,46,2,4,26,3,8,52,2,8,20,3,
16,40,2,64,188,7,32,220,7,16,236,7
1430 DATA 8,244,7,64,184,6,32,216,6,16
,232,6,64,176,5,32,208,5,64,160,4,61,1
28,2,30,192,3,58,128,2,29,192,3
1440 DATA 26,192,3,188,1,7,120,3,6,92,
1,7,184,3,6,176,3,6,12,1,7,28,1,7,60,1
,7,124,1,7,26,1,6,58,1,6,122,1,6
1450 DATA 22,1,5,54,1,5,118,1,5,24,3,6
,118,1,5,24,3,6,56,3,6,120,3,6,48,7,5,
112,7,5,80,7,5,48,128,2,56,128,2
1460 DATA 60,128,2,62,128,2,88,128,3,9
2,128,3,94,128,3,104,128,4,108,128,4,1
10,128,4,24,192,3,28,192,3,30,192,3
1470 DATA 12,224,4,14,224,4,10,224,2,1
,252,7,220,32,7,2,71,2,28,224,7,255,25
5,255,255,255,255,-1
1480 DATA 9,10,11,19,20,21,29,30,31,-1
1490 DATA 104,104,104,72,162,57,160,0,
173,0,210,101,20,141,22,208,141,10,212
,136,208,242,202,208,237,104,56,233
1500 DATA 1,173,31,208,201,6,240,2,208
,221,96,-1
1510 DATA 0,1,2,3,4,5,6,7,0,10,20,30,4
0,50,60,70,7,17,27,37,47,57,67,77,70,7
1,72
1520 DATA 73,74,75,76,77,0,7,70,77,0,0
,0,0
1530 DATA 162,0,169,0,141,198,6,141,19
9,6,157,101,6,232,224,78,208,248,169,0
,141,224,6,174,224,6
1540 DATA 189,11,6,201,0,240,8,169,0,1
41,227,6,76,57,110,169,0,141,227,6,169
,0,141,225,6,169
1550 DATA 0,141,226,6,169,0,141,228,6,
173,224,6,141,229,6,169,0,162,0,236,22
5,6,240,6,105,3
1560 DATA 232,76,167,109,162,0,236,226
,6,240,6,105,1,232,76,180,109,141,233,
6,174,233,6,189,204,6
1570 DATA 109,229,6,233,20,141,229,6,1
70,189,11,6,141,230,6,173,230,6,201,3,
208,3,76,0,110,173
1580 DATA 230,6,201,0,208,8,160,0,140,
228,6,76,0,110,173,230,6,201,2,208,6,2
38,228,6,76,194
1590 DATA 109,76,232,109,162,0,236,228
,6,240,7,232,238,227,6,76,2,110,238,22
6,6,173,226,6,201,1
1600 DATA 208,10,173,225,6,201,1,208,3
,76,14,110,162,3,236,226,6,240,3,76,15
2,109,238,225,6,162
1610 DATA 3,236,225,6,240,3,76,147,109
,173,227,6,174,224,6,157,101,6,238,224
,6,173,224,6,201,78
1620 DATA 240,3,76,119,109,160,0,185,5
6,109,170,189,101,6,201,0,240,3,254,10
1,6,200,192,36,208,237
1630 DATA 162,0,189,101,6,237,198,6,48
,9,189,101,6,141,198,6,142,199,6,232,2
24,78,208,234,104,96,-1
1640 DATA 162,0,142,191,6,189,84,111,2
01,255,240,79,205,214,6,208,30,189,85,
111,205,215,6,208,22,189
1650 DATA 86,111,205,216,6,208,14,169,
0,174,199,6,157,101,6,141,198,6,76,67,
111,189,84,111,205,217
1660 DATA 6,208,30,189,85,111,205,218,
6,208,22,189,86,111,205,219,6,208,14,1
69,0,174,199,6,157,101
1670 DATA 6,141,198,6,76,67,111,232,23
2,232,76,235,110,104,96,169,1,141,191,
6,104,96,-1
1680 REM ***** PRINT NO.S 1-8  *****
1690 FOR R=1 TO 8:A=USR(ADR(AA$),3,R*1
9+1,1,0,1,2,ADR(R$(R,R)),1):NEXT R
1700 FOR R=1 TO 8:A=USR(ADR(AA$),R*11+
4,0,1,0,1,2,ADR(R$(R,R)),1):NEXT R
1710 XC=113:YC=13:IN=1:BK=0:XS=1:YS=1:
M$="SCORE":GOSUB 2290:RETURN
1720 REM ***** PRINT UP SCREEN *****
1730 M$="●":YS=2:X=USR(27900)
```

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1 CAJ (W)	250 L6S (X)	550 UFO (Q)	850 DHO (7)	1150 HP7 (Y)	1450 8OX (E)	1750 75G (L)	2050 U6H (F)	2350 6V9 (Q)
2 CAK (3)	260 5NJ (V)	560 GE4 (D)	860 DS5 (4)	1160 16D (S)	1460 CWM (S)	1760 QWF (T)	2060 MQR (O)	2360 T49 (4)
3 CAL (V)	270 KFW (L)	570 Q4N (T)	870 SGG (9)	1170 XS2 (2)	1470 G91 (D)	1770 NGS (L)	2070 NQT (4)	2370 7SV (X)
4 CAM (4)	280 5XW (K)	580 CQ6 (T)	880 14N (7)	1180 4TF (1)	1480 U3C (1)	1780 K9W (E)	2080 QFU (M)	2380 NXW (4)
5 CAN (W)	290 2UY (9)	590 YPY (T)	890 7F4 (1)	1190 49S (A)	1490 8VL (9)	1790 KJ1 (Y)	2090 TR7 (L)	2390 9TC (V)
6 CAP (7)	300 4KH (X)	600 TLA (9)	900 H3Y (7)	1200 VVS (S)	1500 6R9 (9)	1800 P9S (W)	2100 UOH (T)	2400 UHA (J)
10 XWE (R)	310 X21 (C)	610 PE6 (D)	910 H7X (D)	1210 U12 (8)	1510 PFG (9)	1810 PGS (X)	2110 LWS (J)	2410 HUO (3)
20 CP2 (4)	320 M87 (O)	620 XYS (F)	920 WDD (2)	1220 VDH (1)	1520 2CF (O)	1820 22G (Y)	2120 NJT (M)	2420 ASQ (3)
30 1XN (7)	330 FHR (9)	630 8TU (5)	930 41J (H)	1230 WM2 (E)	1530 KYN (U)	1830 QXJ (V)	2130 EMW (C)	2430 YK4 (Q)
40 N4T (7)	340 PU3 (C)	640 RED (H)	940 6UQ (S)	1240 XTO (9)	1540 K1A (J)	1840 7TD (5)	2140 38H (X)	2440 SM4 (O)
50 LF9 (L)	350 PW3 (9)	650 DGX (U)	950 RTE (U)	1250 XLC (Q)	1550 DVL (W)	1850 Q3L (7)	2150 TM7 (T)	2450 SLT (6)
60 R4P (L)	360 DLU (6)	660 JC8 (A)	960 SCH (Q)	1260 WGE (N)	1560 MV1 (D)	1860 WD5 (F)	2160 UDH (K)	2460 SPO (A)
70 853 (8)	370 JG5 (K)	670 MH9 (C)	970 HJ6 (H)	1270 VM5 (2)	1570 GEM (1)	1870 6PA (U)	2170 N1S (W)	2470 SNP (8)
80 VJR (2)	380 W6D (N)	680 W28 (M)	980 RMA (U)	1280 FDT (S)	1580 FSE (3)	1880 R7T (R)	2180 NWT (T)	2480 SQV (3)
90 K3N (Y)	390 WS2 (T)	690 WM3 (A)	990 VYQ (A)	1290 F9X (V)	1590 JTQ (7)	1890 X2M (3)	2190 M80 (1)	2490 SQK (F)
100 G58 (8)	400 CQE (8)	700 YTO (9)	1000 HTK (7)	1300 GOO (3)	1600 HMG (3)	1900 FMW (F)	2200 TF7 (5)	2500 S9R (C)
110 CYS (6)	410 H9H (M)	710 C15 (G)	1010 133 (S)	1310 EXG (N)	1610 JWP (F)	1910 WHK (G)	2210 U6H (E)	2510 3RY (W)
120 WHS (D)	420 DSD (L)	720 QCQ (H)	1020 CT2 (Q)	1320 QDE (P)	1620 SYY (2)	1920 E6N (E)	2220 M7T (7)	2520 TO7 (5)
130 4M2 (W)	430 DJV (5)	730 7WR (F)	1030 MLN (A)	1330 F2H (G)	1630 UCJ (K)	1930 E8N (G)	2230 NQT (3)	2530 SEX (G)
140 7FO (5)	440 FMQ (R)	740 699 (H)	1040 N7N (M)	1340 7KP (D)	1640 X4C (V)	1940 7QO (C)	2240 F61 (S)	2540 4NA (1)
150 7AT (P)	450 LRJ (S)	750 LRU (8)	1050 MSN (8)	1350 F66 (2)	1650 UVR (T)	1950 WXQ (L)	2250 VVL (Y)	2550 QFA (T)
160 T7R (L)	460 RM2 (8)	760 PMG (U)	1060 199 (C)	1360 G9H (E)	1660 Q9T (H)	1960 D1R (Y)	2260 DKP (T)	2560 8AD (V)
170 S81 (1)	470 VQ8 (1)	770 LSC (L)	1070 VRK (G)	1370 FAR (W)	1670 8D2 (W)	1970 KJV (1)	2270 R1D (2)	2570 UQ4 (O)
180 5JU (N)	480 EHE (8)	780 PVG (7)	1080 UY5 (7)	1380 GFR (S)	1680 E6N (T)	1980 T15 (3)	2280 RLD (S)	
190 DYS (Y)	490 U8D (8)	790 QJQ (N)	1090 Q22 (X)	1390 XYQ (E)	1690 6GD (7)	1990 A79 (6)	2290 N7P (M)	
200 TKU (8)	500 YAG (9)	800 23D (U)	1100 ADS (3)	1400 G2H (1)	1700 8SS (Y)	2000 AP9 (3)	2300 J9R (E)	
210 YRN (H)	510 VXX (L)	810 VY5 (8)	1110 P3V (T)	1410 9JS (O)	1710 7N5 (N)	2010 8EM (3)	2310 NGH (X)	
220 U5W (9)	520 4GV (M)	820 PJ8 (2)	1120 XTQ (6)	1420 7FT (3)	1720 DXN (H)	2020 VFL (5)	2320 PAE (3)	
230 QQA (L)	530 1AY (D)	830 PLR (U)	1130 FQ7 (5)	1430 5TT (X)	1730 NUA (9)	2030 8YG (2)	2330 46N (J)	
240 05E (A)	540 TQ7 (N)	840 R3F (2)	1140 NNE (A)	1440 6CU (Y)	1740 GG8 (6)	2040 TF7 (6)	2340 DNW (P)	

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```
1740 FOR T=1 TO 8:YC=T*19
1750 FOR R=1 TO 8:GOSUB 2280:XC=R*11+4
1760 LOCATE R*11+7,T*19+7,Z
1770 IF Z=PEEK(CO) THEN 1800
1780 IF PEEK(CO)=2 THEN IN=2:GOSUB 229
0:SOUND 0,45,10,10:FOR Z=1 TO 7:NEXT Z
:SOUND 0,0,0,0
1790 IF PEEK(CO)=3 THEN IN=3:GOSUB 229
0:SOUND 0,85,10,10:FOR Z=1 TO 7:NEXT Z
:SOUND 0,0,0,0
1800 NEXT R
1810 NEXT T
1820 CMP=PEEK(1731):HUM=PEEK(1730)
1830 XC=113:YC=13:IN=1:BK=0:XS=1:YS=1:
M$="SCORE":GOSUB 2290
1840 XC=114:YS=2:YC=29:IN=0:BK=0:M$="
 ":GOSUB 2290
1850 IF CMP<10 THEN XC=118
1860 IN=3:M$=STR$(CMP):GOSUB 2290
1870 XC=135:IN=0:M$="  ":GOSUB 2290
1880 IF HUM<10 THEN XC=139
1890 IN=2:M$=STR$(HUM):GOSUB 2290
1900 IF CMP+HUM>97 THEN CMP=-1:HUM=-1
1910 RETURN
1920 REM * SOME USEFUL ROUTINES *****
1930 REM * OFTEN USED,TO SAVE SPACE *
1940 NN=0:N=0:M=1536+(HX*10):FOR R=1 T
O 8
1950 IF PEEK(M+R)=2 THEN N=N+A(R)
1960 IF PEEK(M+R)=3 THEN NN=NN+A(R)
1970 NEXT R:POKE 1750,NN:POKE 1751,N:P
OKE 1752,HY
1980 NN=0:N=0:M=1536+HY:L=1:FOR R=10 T
O 80 STEP 10
1990 IF PEEK(M+R)=2 THEN N=N+A(9-L)
2000 IF PEEK(M+R)=3 THEN NN=NN+A(9-L)
2010 L=L+1:NEXT R:POKE 1753,NN:POKE 17
54,N:POKE 1755,9-HX
2020 RETURN
2030 A=HX:NN=0:N=0:M=1536+(HX*10)+HY:F
OR R=M-11 TO M-200 STEP -11:A=A-1
2040 IF PEEK(R)=2 THEN N=N+A(A)
2050 IF PEEK(R)=3 THEN NN=NN+A(A)
2060 IF PEEK(R)=4 THEN 2080
2070 NEXT R
2080 A=HX:M=1536+(HX*10)+HY:FOR R=M+11
 TO M+200 STEP 11:A=A+1
2090 IF PEEK(R)=2 THEN N=N+A(A)
2100 IF PEEK(R)=3 THEN NN=NN+A(A)
2110 IF PEEK(R)=4 THEN 2130
2120 NEXT R
2130 POKE 1750,NN:POKE 1751,N:POKE 175
2,HX
2140 A=HY:NN=0:N=0:M=1536+(HX*10)+HY:F
OR R=M-9 TO M-200 STEP -9:A=A+1
2150 IF PEEK(R)=2 THEN N=N+A(A)
2160 IF PEEK(R)=3 THEN NN=NN+A(A)
2170 IF PEEK(R)=4 THEN 2190
2180 NEXT R
2190 A=HY:M=1536+(HX*10)+HY:FOR R=M+9
TO M+200 STEP 9:A=A-1
2200 IF PEEK(R)=2 THEN N=N+A(A)
2210 IF PEEK(R)=3 THEN NN=NN+A(A)
2220 IF PEEK(R)=4 THEN 2240
2230 NEXT R
2240 POKE 1753,NN:POKE 1754,N:POKE 175
5,HY
2250 RETURN
2260 REM ** ILLEGAL MOVE SUBRTN. **
2270 XC=21:YC=175:IN=1:YS=1:M$=".ILLEG
AL.":GOSUB 2290:RETURN
2280 CO=1536+(T*10)+R:RETURN
2290 A=USR(ADR(AA$),XC,YC,IN,BK,XS,YS,
ADR(M$),LEN(M$)):RETURN
2300 DATA 104,162,0,142,194,6,142,195,
6,189,11,6,201,2,208,3,238,194,6,201,3
,208,3,238,195,6
2310 DATA 232,224,79,208,234,96,-1
2320 XC=15:YC=175:IN=1:YS=1
2330 IF CMP>HUM THEN M$=" I WIN  + St
art"
2340 IF CMP<HUM THEN M$="YOU WIN + St
art"
2350 IF CMP=HUM THEN M$="A DRAW  + St
art"
2360 GOSUB 2290
2370 X=USR(ADR(II$),255)
2380 GOTO 70
2390 FOR R=1547 TO 1617 STEP 10:FOR T=
R TO R+7:IF PEEK(T)=2 THEN POKE T,3:GO
TO 2410
2400 IF PEEK(T)=3 THEN POKE T,2
2410 NEXT T:NEXT R:RETURN
2420 C=0:H=0:FOR R=1 TO 8:FOR T=1 TO 8
2430 AM=0:IF R=1 OR R=8 THEN AM=4
2440 IF T=1 OR T=8 THEN AM=AM+4
2450 IF R=2 OR R=7 THEN AM=AM+3
2460 IF T=2 OR T=7 THEN AM=AM+3
2470 IF R=3 OR R=6 THEN AM=AM+2
2480 IF T=3 OR T=6 THEN AM=AM+2
2490 IF R=4 OR R=5 THEN AM=AM+1
2500 IF T=4 OR T=5 THEN AM=AM+1
2510 G=1536+(R*10)+T
2520 IF PEEK(G)=2 THEN H=H+AM
2530 IF PEEK(G)=3 THEN C=C+AM
2540 NEXT T:NEXT R
2550 XC=113:YC=13:IN=1:BK=0:XS=1:YS=1:
M$="JUDGE":GOSUB 2290
2560 T=C+H:HUM=INT(H/T*100):CMP=100-HU
M
2570 YS=2:GOSUB 1840:RETURN
```

SOFTWARE Solutions

Your programming problems solved by ANDRÉ WILLEY

LET'S get cracking straight away with a letter from Philip Carter from Frome in Somerset who is having a few problems with his 800XL.

While I was playing around with my micro I decided to write a Basic trigonometry program. When I got round to the tangents, sines, cosines and inverse tangents I came across the problem that my machine did not seem to accept the trig statements correctly. Instead it gave ERROR 9 AT LINE 127, which was simply:

```
127 LET A=TAN(B)
```

This also happened for the sines and cosines and the inverse tangent. Since Error 9 means an array or string error, and I'm using neither, is there something wrong with my micro?

Firstly I don't think that there's anything much wrong with your computer – your problems stem from a slight misunderstanding of how Basic handles trig operations. To be strictly accurate, Atari Basic only supports three fundamental trigonometry operations – sin, cosine and inverse tangent (or arc-tangent as it is more commonly known).

The commands to use are SIN(number), COS(number) and ATN(number), so your use of the command TAN was not recognised. However, Basic still tried to make sense of the statement by assuming you were talking about an array variable called TAN. Since you had obviously not DIMmed such an array, it finally gave up and resorted to giving out an Error 9 – for an undimensioned array reference.

I suspect that the other errors might have been caused by your using SINE(number) or COSINE(number) instead of the shortened SIN and COS which are required. These too would have been interpreted as undimensioned arrays.

So how do you work out such things as tangents when Basic doesn't seem to provide a command for them? Luckily trigonometry is entirely logical, and just about any function can be calculated from the main three we've seen so far. You will also need to use some other mathematical operations – most notably natural logarithms and square roots, both of which are readily available.

You don't require the base 10 logarithms given by CLOG(number), but those based on powers of the mathematical value of e, or 2.71828. These are given using the LOG function, and antilogs are given by using EXP, which returns a result given by raising the number to the power of e.

For example, if you think back to your school days and good old Pythagoras, the tangent of an angle is calculated using the very simple formula of sine divided by cosine. In computer terms, the tangent of the variable X would be given by:

```
LET ANSWER=SIN(X)/COS(X)
```

Don't forget that some values for various trigonometric formulae are illegal – there is no tangent of the angle 90° for example because cos 90° equals zero, and you can't divide by zero.

You should also decide whether you want to work in degrees or radians – selected by using the DEG or RAD commands. There is obviously no point testing for an angle of 90° when you're working in radians – you should instead check for a value of $\pi/2$.

The panel on the following page lists some of the more common trig functions and how to derive them, but make sure you test for any illegal values or you'll have another error on your hands. Don't forget there are lots more formulae if you need them – check out Appendix C of Your Atari Computer manual, or consult your local library for books on trigonometry.

Slow clock?

Next we have an international enquiry from **Mr A. Grünbauer** from Holland. It's nice to see so many letters coming in from abroad, and the standard of the English rather puts us Brits to shame when it comes to learning foreign languages – the nearest thing I come to a second language is Action! Anyway, Mr Grünbauer writes:

I must first tell you that you are selling the best English Atari magazine I have ever read. Keep up the good work. As I was reading my manual I discovered the following line:

```
Processor 6502C
(Clock Speed 1.79 Mhz)
```

Isn't that a little slow for a great computer like this? For instance, the MSX Z80 processor has a clock speed of 8.0 Mhz. As I know nothing about this I would like to know just what the clock speed is used for and if it has anything to do with the calculation speed of my 130XE.

In order to function, a CPU chip like the 6502 must be able to work in close association with all the other chips inside the computer. This means that

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SOFTWARE Solutions

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it must regulate its own tasks to match the speeds of the ram chips, the I/O devices and, in the Atari's case, the special graphics and sound chips. If they did not all run in perfect synchronisation the micro would instantly crash.

In order to keep to this strict timing a tiny crystal inside the casing of the micro sends out a very fast stream of pulses which are then used by all of the major chips to time their various activities. Thus the 6502 knows exactly when to ask the ram for information, and also when POKEY will be ready to accept a byte of sound data.

The crystal inside a European Atari oscillates at 3 Mhz – three million times a second. The display chip Antic needs nearly half of these cycles for its own use, so the 6502 gets left with, as the message says, 1.79 million clock cycles every second.

The MSX machine you mentioned has a clock speed of 8 Mhz, or 8 million cycles per second, but you won't find it runs that much faster than your Atari for two main reasons.

Firstly the 8 Mhz clock will also have some cycles "stolen" by special display chips similar to, but nowhere near as powerful as, our very own ANTIC.

Secondly, although they are both 8 bit microprocessors, the Z80 and the 6502 function quite differently internally. The former has a more powerful set of registers for calculations and many more instructions, but it often uses up a lot more clock cycles to do each job. In general terms, a Z80 would take three to four times as many cycles as a 6502 to perform a given task.

So overall there will be little difference in CPU instruction speed between a 6502 running at 2 Mhz and a Z80 running at 8Mhz. Any differences between the speeds of execution of Basic programs are more likely to be due to the skill of the writers of the Basic interpreter used on the machine in question.

Atari Basic is fairly fast in itself, but is badly let down by the maths package in the operating system. This means that overall Atari Basic is nowhere near as fast as such machines as the BBC Micro, but if you tried a machine code comparison you'd see little or no difference.

Email uploading

THE final letter this month comes in by electronic mail from a Dave on MicroLink's Atari section:

I use my Atari and a modem to talk to the MicroLink system, and I want to prepare electronic mail and other text while off-line so that I can transmit my messages in a block and log off again.

I am unable to get Mini Office II to upload text to the bulletin board, or to use the WPMAIL feature. When I'm trying to upload, the text appears about two inches in from the left of my TV screen, and this means that the MAIL command is not detected by MicroLink. I don't know why I cannot upload to the BB, but maybe it's a related problem?

In both cases I save my word processor files in Ascii text format, but the commands do not seem to register when I try to upload the file. Any help would be much appreciated.

As this was an electronic mail question I have obviously also sent an online answer to Dave, but the solution may well interest other Email users.

When you edit a document using the Mini Office II word processor you have the option of saving the text in internal format – which stores all the embedded control codes and formatting commands – or of storing a straight Ascii text version.

MicroLink – like most other Email services – requires its messages to be in standard Ascii text form, with any commands at the start of the line. You can, for example, use the command .SEND to post your letter on to the system, or .EDIT if you decide you wish to do some online editing or .QUIT to abort the current mail item.

What has happened in this case is that you have saved the Ascii text with the margin still set for printing normal letters – at 10 characters. This means that each line of text in the disc file starts with 10 blank spaces, and so the mail commands are not recognised. MicroLink does not strip spaces off the start of each line in the same way that Basic does because you might wish to use spaces to offset some portion of your letter.

All you need to do is to re-set your Mini Office II left margin to zero, which can be done with embedded commands or via the menu system. Then save the document as an Ascii file and go to the communications program.

Log on to the remote system (such as MicroLink) and go to the mail section. You should then type Control+Shift+T – or use the menu – in order to select the filename to transmit. The filter mode should be set to Standard Ascii.

When you're ready to send, press the Start button and off it will go. This method should allow you to prepare text off line and then transmit it with the minimum of fuss to almost any electronic mail system – all from your humble 8 bit Atari.

● *Well, that just about wraps it up for this time. Keep those letters coming in – especially if you're still struggling with your first few programs on your new Atari 8 bit computer.*

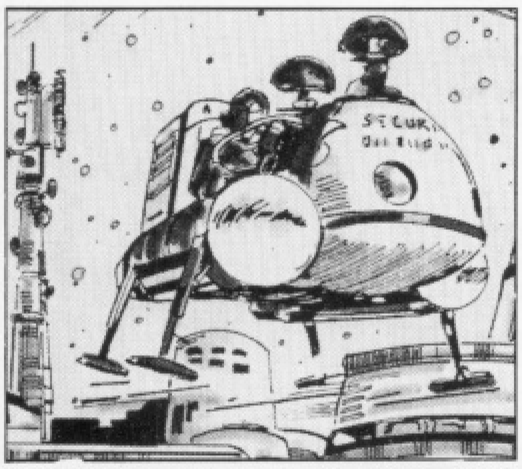
TRIG	BASIC
Tangent(X)	SIN(X)/COS(X)
Inverse sine(X)	ATN(X/SQR(-X*X+1))
Inverse cosine(X)	-ATN(X/SQR(-X*X+1))+90
Cotangent(X)	COS(X)/SIN(X)
Inverse cotangent(X)	-ATN(X)+90
Secant(X)	1/COS(X)
Inverse secant(X)	ATN((SQR(X*X-1))+SGN(X)-1)*90
Cosecant(X)	A=1/SIN(X)
Inverse cosecant(X)	ATN(1/SQR(X*X-1))+(SGN(X)-1)*90
Calculated in degrees – change any number 90 to PI/2 for radians	

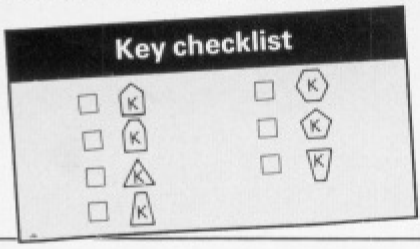
Derived trigonometric functions

Your **HINTS & TIPS**

Mercenary: The Second City

LAST month we published a map to this superb science-fiction adventure game. To complement it here is a useful checklist to the keys and objects you will find: Just tick them off when you get them.





Object checklist

- ☐ Antenna
- ☐ Antigrav (AG)
- ☐ Anti-time bomb (ATB)
- ☐ Bed
- ☐ Catering provisions (CP)
- ☐ Chair
- ☐ Chart
- ☐ Cheese
- ☐ Coffin
- ☐ Databank
- ☐ Energy crystal (EC)
- ☐ Essential 12939 supply
- ☐ Fire
- ☐ Gold
- ☐ Grenade
- ☐ Kitchen sink
- ☐ Lamp
- ☐ Large box (LB)
- ☐ Mechanoid (M)
- ☐ Medical supplies (MS)
- ☐ Metal detector (MD)
- ☐ Music stand
- ☐ Neutron fuel
- ☐ Novadrive (ND)
- ☐ Oven
- ☐ Pass
- ☐ Photon emitter (PE)
- ☐ Poweramp (PA)
- ☐ Prestinium
- ☐ Sights
- ☐ Table
- ☐ Transmitter
- ☐ Useful armanent (UA)
- ☐ Winchester
- ☐ Web

● *You may photocopy this page to save cutting your magazine if you wish.*

It's a moving experience

Continuing his Basic programming series LEN GOLDING introduces simple animation techniques

So far we've seen how to produce text displays and static pictures anywhere on screen. The next step is to make the images move around – computer animation in fact.

All arcade games use movement in one form or another, and the Atari computers have some very sophisticated built-in animation facilities – notably Player-Missile – *PM* – graphics. We'll get on to these in due course, but they are quite difficult to understand and usually require machine code to make them work, so we'll steer clear for the present.

It's relatively easy though, to produce fast animation using ordinary keyboard characters, and this month we show you how to do it. We'll encounter the IF...THEN command, together with the joystick functions STICK and STRIG. We'll also take our first look at subroutines, using the commands GOSUB and RETURN.

Armed with these new techniques you will be able to write your first joystick-controlled games, and we've listed one to demonstrate the basic principles behind arcade action.

In order to create the illusion of movement you must first print your character, then quickly erase it and print it again in an adjacent position. So long as there is no background to disturb, this is very easy. Try this:

```
10 PRINT CHR$(125):REM Clear the screen
20 FOR H=10 TO 30
30 POSITION H,10:PRINT CHR$(20):REM
Print the ball
40 FOR W=1 TO 50:NEXT W:REM Short delay
50 POSITION H,10:?CHR$(32):REM Blank
space erases ball
60 NEXT H
```

This prints a small ball which apparently moves across the screen from left to right. The cursor is also printed, which is rather distracting, but you can turn it off by POKE 752,1 followed by a PRINT statement, as we'll see shortly.

We can make the program more interesting by using a joystick to control the movement.

A joystick is just a simple switching device which can generate numbers between 5 and 15, depending on the stick position – see Figure I. If you plug a stick into port 1, the number which shows its current position – 5 to 15 – is automatically stored in a function called STICK(0).

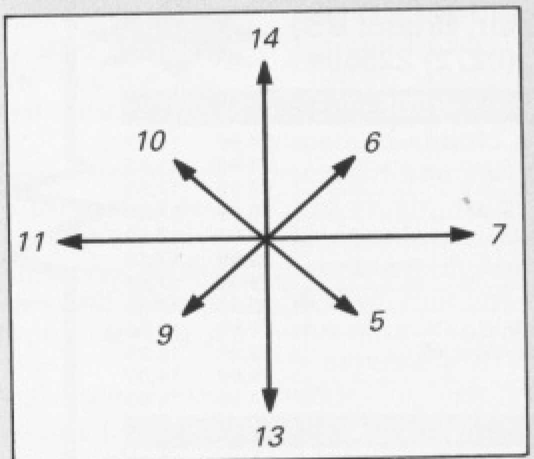


Figure I: Numbers produced by a joystick

This behaves like an ordinary variable, except that the computer's operating system sets it up for you and updates it automatically every fiftieth of a second. All you have to do is check the current value stored in it, for example by:

```
PRINT STICK(0)
```

and this will reveal the joystick's current position. There's also a function –

STICK(1) – which reads a joystick plugged into port 2.

Two other functions – STRIG(0) and STRIG(1) – read the state of the trigger buttons. When no button is pressed both contain the value 1. If you press the button on a stick plugged into port 1, STRIG(0) will go to the value 0.

STRIG(1) behaves in exactly the same way for a fire button operating through port 2. You can check the action of all four functions using this little program:

```
10 PRINT CHR$(125)
20 POSITION 2,10:PRINT STICK(0);" ",ST
RIG(0),STICK 1;" ",STRIG(1)
30 GOTO 20
```

Plug your joystick into port 1 or port 2, move it around, press the trigger and watch what happens.

Program I shows one technique for joystick control using the IF...THEN command. This is extremely useful, and you'll come across it in almost every game you encounter, so it's worth taking the time to understand it thoroughly.

Basic starts by looking at the IF part to see whether that condition is true or

```
10 REM PROGRAM 1: Two-directional joys
tick control
20 POKE 752,1:PRINT CHR$(125):REM Swit
ch cursor off and clear screen
30 H1=20:REM Current horizontal co-ord
inate
40 H2=20:REM Will be used as new horiz
ontal co-ordinate
50 POSITION H1,11:PRINT CHR$(20):REM P
rint ball at initial position
60 IF STICK(0)=15 THEN GOTO 60:REM Do
nothing if stick centralised
70 IF STICK(0)=7 THEN H2=H1+1:GOTO 100
:REM New co-ordinate is one column rig
ht
80 IF STICK(0)=11 THEN H2=H2-1:GOTO 10
0:REM New co-ordinate is one column le
ft
90 GOTO 60:REM take no action for any
other stick positions
100 POSITION H1,11:PRINT " ":REM Erase
 ball at current position, by printing
 a space
110 POSITION H2,11:PRINT CHR$(20):REM
Print ball at new horizontal position
120 H1=H2:REM Update current cursor po
sition, ready for next cycle
130 FOR W=1 TO 30: NEXT W: REM Short d
elay slows down movement
140 GOTO 60
```

Program I: Joystick control

not. If it is the rest of the program line is executed, but if not, Basic ignores everything else on that program line – including any other statements separated by colons – and skips to the next line in sequence.

To see the IF...THEN statement in action let's examine Program I in detail. Two main variables are involved – *H1* and *H2*. The former holds the character's current horizontal position and the latter is the position it has to move into.

H2 will have the value H1+1 if the character has to move one space right, or H1-1 if movement left is required.

The vertical position remains constant at 11, which means that the ball will not move up or down, just side to side on the 12th line down – the top line is line 0, remember.

Now look at line 60. If the value of STICK(0) is equal to 15 – stick centralised – the program stays there. If STICK(0) is not equal to 15, Basic moves on to line 70 where it checks to see whether the stick value is 7 – pointing right. If so, it adds 1 to the current value held in *H1*, stores the new value in *H2* and jumps to line 100.

If the stick value is not 7 the program skips to line 80. This line sets *H2* to H1-1 if STICK(0) is equal to 11 – pointing left. Any value other than 15, 7 or 11 will take it to line 90 which loops back to start the checking process without affecting *H1* or *H2*. The net result is that all joystick positions other than left and right are ignored.

Line 100 prints a blank space at the position which the ball currently occupies (H1,11) – thereby erasing it from the screen – then line 110 reprints the ball at its new co-ordinates (H2,11). This happens so quickly that the ball appears to jump from one position to the other.

H2 now holds the cursor's current horizontal position, and line 120 transfers this value into *H1* ready for the next cycle. Line 130 introduces a short delay which makes the movement slow enough to handle easily – you can omit this line if you want to move at full speed. Finally, line 140 loops back to start the process all over again.

There is nothing in this program to stop the ball moving off screen, so if you allow the ball to reach a screen border you'll get an error message. You can avoid this by using a second IF...THEN statement to prevent further

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movement if the ball hits either boundary.

The least complex way of doing this is to nest the second IF...THEN statement inside the first. Change lines 70 and 80 to read:

```
70 IF STICK(Ø)= 7 THEN IF H1<39 THEN H
2=H1+1:GOTO 1ØØ
8Ø IF STICK(Ø)= 11 THEN IF H1>Ø THEN H
2=H2-1:GOTO 1ØØ
```

The symbol < means *is less than* and > means *is greater than*. So line 70 will now update *H2* only if the stick is pointing right AND if the character has not yet reached the right-hand border. Similarly line 80 will update *H2* only if the stick is pointing left and the character has not reached the left border.

Once you understand how this program works you're ready for Program II – our first game. It's called Spider Attack and uses most of the techniques you've learned so far. If, when you type it in, there's anything you don't understand, go back and re-read the earlier parts of this series – all the information is there for you.

```
1Ø REM Program 2: Spider Attack game
2Ø POKE 752,1:PRINT CHR$(125):REM Make
 cursor invisible and-clear screen
3Ø H1=2Ø:H2=2Ø:SHOT=Ø
4Ø FOR STAR=2 TO 38 STEP 2:POSITION ST
AR,22:PRINT "*":NEXT STAR:REM Print li
ne of spiders
5Ø POSITION H1,Ø:PRINT CHR$(Ø):REM Her
oine's "heart" character
6Ø IF STRIG(Ø)=Ø THEN GOTO 15Ø
7Ø IF STICK(Ø)=15 THEN GOTO 6Ø
8Ø IF STICK(Ø)=7 THEN IF H1<38 THEN H2
=H1+1:GOTO 11Ø
9Ø IF STICK(Ø)=11 THEN IF H2>1 THEN H2
=H1-1:GOTO 11Ø
1ØØ GOTO 6Ø
11Ø POSITION H1,Ø:PRINT " ";:REM ONE S
PACE
12Ø POSITION H2,Ø:? CHR$(Ø);:H1=H2
13Ø GOTO 6Ø
14Ø REM Routine to throw mothball:
15Ø FOR ROW=1 TO 22
16Ø POSITION H1,ROW:PRINT CHR$(96)
17Ø FOR W=1 TO 1Ø:NEXT W
18Ø POSITION H1,ROW:? " "
19Ø NEXT ROW
2ØØ SHOT=SHOT+1:IF SHOT=22 THEN POSITI
ON 15,1Ø:PRINT"GAME OVER":END :REM Cou
nt shots _ Max 22
21Ø PRINT :REM Invisible cursor is now
 on bottom line, so this PRINT command
 scrolls the screen upwards one line
22Ø GOTO 5Ø
```

Program II: Spider attack game

The scenario involves a young lady who is frightened of spiders and must hurl mothballs at them to deter their inexorable advance. The heroine is represented by a heart – CHR$(0) – at the top of the screen – yes, I know it's sexist, but I couldn't find a macho symbol in the character set. The mothball missiles are represented by the ball character – CHR$(96). The spiders are asterisks – a mutant variety with six legs.

As the game starts our heroine is at the top centre of the screen and the line of spiders is near the bottom. Use the joystick to move from side to side and the fire button to hurl a mothball. If the missile hits a spider it will obliterate it, but after every shot the abominable arachnids will advance one line up the screen. Your task is to eliminate as many as possible before they reach the top line.

Right, how does it work? Line 20 turns off the cursor so that it doesn't interfere with the action. Unless you do this the little white square will be zipping around all over the screen with every POSITION command. It's still there of course, but the POKE command makes it invisible.

Line 30 sets up the variables which will be used to control horizontal movement and to keep track of the number of shots. Line 40 prints a row of nineteen asterisks near the bottom of the screen, and line 50 prints the heroine's heart character at top centre.

Lines 60 to 130 read the joystick and move the heroine one space left or right using the technique we explained in Program I. Line 60 checks to see if the fire button is pressed and, if it is, control passes straight to line 150 which handles the mothball movement.

Since the mothballs have to move vertically down the screen, the horizontal co-ordinate remains constant and the vertical co-ordinate increases according to the FOR...NEXT loop which starts at line 150.

As before, each move prints a blank space at the character's current location, then re-prints the character at its new position.

Line 200 keeps track of the number of mothballs thrown and ends the game when it reaches 22. The command END does precisely what you'd expect it to – it terminates pro-

gram execution and returns control to you with a READY message.

The clever bit is at line 210: This controls the spider's movement up screen using a command to PRINT nothing. It works because the invisible cursor must inevitably be on the bottom line after tracking a mothball all the way down screen. So any PRINT statement will now make the whole screenful of characters scroll upwards by one line.

This means that the heroine ascends into oblivion, of course, but the final jump to line 50 immediately restores her to her rightful position.

You might like to improve the game by adding sound to it. Try linking the pitch of a SOUND statement to one or more of the existing variables – for example:

```
155 SOUND 0,ROW,10,8
```

or, for greater variation, make the pitch 10 times the value of *ROW* as in:

```
155 SOUND 0,ROW*10,10,8
```

And don't forget to switch the sound off when you've finished with it:

```
195 SOUND 0,0,0,0
```

So much for two-directional joystick movement. Now take a look at Program III, but don't bother typing it in. This one uses familiar techniques but allows you to move a character in any direction under joystick control.

It has to be a lot more complex, since instead of just two directions there are now eight to worry about – up, down, right, left and four diagonals. And there must be a boundary check for each direction.

This leads to an annoying amount of repetition in the program, and each diagonal direction needs two separate lines of IF...THEN statements – one for the horizontal and the other for the vertical component. You'd be right in thinking that there must be a better way, and in fact there are several, but the one we'll look at just now is the subroutine.

This is a sort of mini program-within-a-program. It usually handles a clearly defined and self-contained task, especially if that task has to be executed more than once during the main program. It can be called at any point using the command GOSUB followed by the line number at which

```
10 REM PROGRAM 3: Cumbersome method fo
r 8-directional joystick control
20 H1=19:V1=11:REM Current Horizontal
and Vertical co-ordinates
30 H2=H1:V2=V1:REM New horizontal and
Vertical co-ordinates
40 POKE 752,1:? CHR$(125):REM Turn cur
sor off and clear screen
50 POSITION H1,V1:? CHR$(20):REM Print
 ball at its starting position
60 S=STICK(0):REM Read position of joy
stick in port 1
70 IF S=15 THEN GOTO 60:REM Do nothing
 if stick centralised
80 REM Find next position for the ball
 to be printed:
90 IF S=14 THEN IF V1>1 THEN V2=V1-1:G
OTO 210:REM Up only
100 IF S=6 THEN IF V1>1 THEN V2=V1-1
110 IF S=6 THEN IF H1<38 THEN H2=H1+1:
GOTO 210:REM Diagonal up/right
120 IF S=7 THEN IF H1<38 THEN H2=H1+1:
GOTO 210:REM Right only
130 IF S=5 THEN IF V1<22 THEN V2=V1+1
140 IF S=5 THEN IF H1<38 THEN H2=H1+1:
GOTO 210:REM Diagonal down/right
150 IF S=13 THEN IF V1<22 THEN V2=V1+1
:REM Down only
160 IF S=9 THEN IF V1<22 THEN V2=V1+1
170 IF S=9 THEN IF H1>1 THEN H2=H1-1:G
OTO 210:REM Diagonal down/left
180 IF S=11 THEN IF H1>1 THEN H2=H1-1:
REM Left only
190 IF S=10 THEN IF V1>1 THEN V2=V2-1
200 IF S=10 THEN IF H1>1 THEN H2=H1-1:
REM Diagonal up/left
210 POSITION H1,V1:? CHR$(32):REM Eras
e old ball by printing a space over it
220 POSITION H2,V2:? CHR$(20):REM Prin
t ball at new co-ordinates
230 H1=H2:V1=V2:REM Update H1 and V1 r
eady for next cycle
240 GOTO 60: REM Next cycle
```

Program III: Cumbersome method for joystick control

your subroutine starts, for example:

```
GOSUB 100
```

And as long as the subroutine ends with a RETURN command, Basic will automatically jump back to the next statement after its point of departure.

In the example below we have used a subroutine to produce a short bleep when you enter a value for either *X* or *Y* from the keyboard.

```
10 INPUT X:GOSUB 40
20 INPUT Y:GOSUB 40
30 GOTO 10
40 SOUND 0,100,10,8
50 FOR W=1 TO 40 :NEXT W
60 SOUND 0,0,0,0,:RETURN
```

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After the first call (line 10), Basic will automatically go to line 20. After the second call (line 20) it will return to line 30. GOSUB is obviously a lot more versatile than GOTO, which can only ever jump to a single, fixed point in your program.

If there are any further statements on the line containing your GOSUB command, Basic will return to the next statement after GOSUB – unlike IF...THEN, it doesn't need to skip to the next line.

Note the GOTO 10 at line 30. Without this Basic would crash through into the subroutine section and, when it encountered the RETURN command, it wouldn't know where to go. You'd then get ERROR 16 indicating RETURN without a corresponding GOSUB.

Program IV shows how you can use subroutines to avoid much of the repetitive typing in Program III. There are four subroutines controlling movement up, down, right and left respectively, and each contains its own boundary check. If vertical upward movement is required we instruct the computer to GOSUB 220. To go left it's GOSUB 280, and to move diagonally up-left we simply call both routines one after the other – GOSUB 220:GOSUB 280. Using this technique it's easy to move a character in any of the eight possible directions.

The code for our joystick control routine is now shorter and much easier to understand – compare lines 90 to 160 in Program IV with lines 90 to 200 in Program III.

Because the subroutines can be called more than once – from different places in the program – there's very little repetitive typing to do. You can write subroutines to handle any repetitive chores of this kind, and they make the program structure more elegant.

● *Next month we'll demonstrate how you can move characters in eight directions without disturbing a background picture, and start to look at the use of colour in Graphics Modes 2 and 3.*

Until then try these routines and write some of your own. Remember, practice makes perfect.

```
10 REM PROGRAM 4: More elegant 8-way j
oystick control, using subroutines
20 H1=19:V1=11:REM Current Horizontal
and Vertical co-ordinates
30 H2=H1:V2=V1:REM New horizontal and
Vertical co-ordinates
40 POKE 752,1:? CHR$(125):REM Turn cur
sor off and clear screen
50 POSITION H1,V1:? CHR$(20):REM Print
 ball at its starting position
60 S=STICK(0):REM Read position of joy
stick in port 1
70 IF S=15 THEN GOTO 60:REM Do nothing
 if stick centralised
80 REM Find next position for the ball
 to be printed:
90 IF S=14 THEN GOSUB 220:GOTO 170:REM
 Up only
100 IF S=6 THEN GOSUB 220:GOSUB 260:GO
TO 170:REM Up/right
110 IF S=7 THEN GOSUB 260:GOTO 170:REM
 Right only
120 IF S=5 THEN GOSUB 240:GOSUB 280:GO
TO 170:REM Down/right
130 IF S=13 THEN GOSUB 240:GOTO 170:RE
M Down only
140 IF S=9 THEN GOSUB 240:GOSUB 280:GO
TO 170:REM Down/left
150 IF S=11 THEN GOSUB 280:GOTO 170:RE
M Left only
160 IF S=10 THEN GOSUB 220:GOSUB 280:R
EM Up/left
170 POSITION H1,V1:? CHR$(32):REM Eras
e old ball by printing a space over it
180 POSITION H2,V2:? CHR$(20):REM Prin
t ball at new co-ordinates
190 H1=H2:V1=V2:REM Update H1 and V1 r
eady for next cycle
200 GOTO 60
210 REM Subroutines start here:
220 IF V1>1 THEN V2=V1-1:REM Prepare t
o move up, if there's room
230 RETURN
240 IF V1<22 THEN V2=V1+1:REM Prepare
to move down, if there's room
250 RETURN
260 IF H1<38 THEN H2=H1+1: REM Prepare
 to move right, if there's room
270 RETURN
280 IF H1>1 THEN H2=H1_1:REM Prepare t
o move left, if there's room
290 RETURN
```

Program IV: Elegant joystick movement

Put in the boot when all else fails

JUST before Christmas I bought a 65XE system. My first attempts with the micro have been quite frustrating to say the least, and I have several questions.

Firstly, I have been experiencing great difficulty loading some of the games I got with the computer. It appears that it is not sufficient to just simply type CLOAD. What else do I have to do?

Is it possible to expand the micro's memory, and what is the best disc drive to use with it? Finally, will old games like Drol and Conan the Barbarian run on my computer? – **A. White, Barnsley, South Yorkshire.**

● Most of the tapes you got with your computer contain machine code programs. You can't load these direct from Basic – so you must *BOOT* them. You do this by holding the Start and Option keys down as you switch the micro on.

You will hear a beep, and at this point insert the tape and press Return. Then just wait a while and the program will load.

It is possible to upgrade the memory of your 65XE, but the 64k of memory it has is enough to run any software currently available.

Any of the Atari disc drives will work with it although, at the moment, there is a slight problem obtaining one. Atari plans to release a new disc drive which should be available soon.

Most games written for the old style micros – Atari 400 and 800 – will work on your XE system. However, some differences in operating systems between the new and old machines mean certain software will not work – but this is only a minority.

Drol and Conan the Barbarian will work perfectly.

Display width poke

I HAVE just bought a book for my Atari called Software for the XL. There's a program in it called Omniopoly, and every time I try to type in the listing I get an error at line 605.

When I list this line the end is always missing, and try as I may I can't get it to go in. Can you please tell me how to enter this line? – **Derek Goring, Leeds.**

● Before you attempt to enter the listing type POKE 82,0 followed by Return. This will increase the width of the display and allow you to enter more characters per program line.

Also use all possible abbreviations for commands – for example: G. for GOTO – and enter the line without any spaces, as Basic will automatically insert them for you.

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Europa House
Adlington Park
Adlington
Macclesfield SK10 4NP

Boost for Atari comms

I FOUND the article on modems in the January issue very interesting: It doesn't seem that long ago that it was almost impossible to buy a modem for an Atari.

However, despite this improvement, we Atari owners for a long time were still lacking in communications software that would allow the use of teletext mode and support split baud rates.

Part of the trouble was the Atari 850 interface box that was for a long time the only way of connecting anything to an Atari.

Then Miracle Technology brought out its interface and cable and Multiviewterm software which allows the use of split baud rates and the viewdata modes.

Now Atari users are not restricted to 300/300 bulletin boards and MicroLink/Telecom Gold and can now access Prestel and 1200/75 bulletin boards to their heart's content. – **Peter Boulter via MicroLink.**

Saving with paint

COULD you please tell me if it is possible to save or print pictures from the Paint artist package? I have an Atari 130XE, 1050 disc drive and 1029 printer.

I have drawn some quite good pictures and it is most annoying to just switch off the system and lose them. – **Michael Simons, Crowborough, East Sussex.**

● You can save pictures created using Paint by entering the disc menu from the main menu and selecting Save File. Enter the filename when prompted, but make sure you have a Dos disc in the drive.

In the January 1988 issue of *Atari User* there was a program to convert Paint picture files to a 62 sector uncompressd file, and in the same issue there was also a utility to print the newly-converted picture on an Atari 1029 printer.

Cartridge gadget

I OWN an Atari 130XE and 1050 disc drive and I am very happy with it except for one small problem concerning the cartridge socket.

The way the system is located on my desk makes it very difficult to plug and unplug cartridges without having to move the computer.

Apart from the annoyance at moving it I'm also worried about the wear and tear on the socket. Would it be possible for your gadgets expert Len Golding to design something to overcome my problems? – **Robbie James, Warrington.**

● Although it would be possible for Len to design such a gadget it could work out to be rather expensive, and if any mistakes were made in its construction it could damage your computer quite badly. So regretfully, it's a non-starter.

Recipe for success

IN the October 1987 issue of Atari User *there was a letter from John Upton asking for information about astrology*

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and cookery programs for the 8 bit Atari.

I know of a couple of programs available on astrology, one from The Catalog, 544 Second Street, San Francisco, CA U.S.A and one from Astrocalc, 67 Panscroft Road, Hemel Hempstead, Herts HP3 8ER.

A good cookbook/recipe program is available from New Horizons, P.O. Box 180253, Austin, TX 78718 U.S.A. It is called The Computer Gourmet and is very useful and informative. – **R. Lussier, Burnaby, Canada.**

Sub hunting for errors

COULD you please tell me if there is anything missing from the listing of Submarine Hunter that appeared in the January 1988 issue of Atari User?

I am convinced I have entered it correctly, but when I play it I find that no score appears at the bottom of the screen. – **M. Fitzgerald, Darlaston, West Midlands.**

● The listing we published was complete and works perfectly. Check the lines of data very carefully, as a mistake there may not crash the game but could cause the wrong information or none at all to be displayed.

£10 LETTER

The Melody lingers on

What a marvellous program Melody Maker by Bruce Woodland is (February 1988). I typed it in and have throughly enjoyed playing tunes on it ever since.

However, as it stands it is not suitable for playing guitar music, which needs a greater range of notes and a larger memory store – the third movement of Barrios' La Catadral needs 4125 bytes to store including its repeats.

Also tunes are stored in files whose size is set by the variable CAP, so a little jingle occupies the same size as a symphony.

The following changes to the program will remedy these slight discrepancies:

```
110 CAP=5000:REM MAX TUNE LE
NGTH
140 DIM K$(18),NREF$(27),KSG
$(27)
150 DIM PICK$(20),SCALE$(27)
160 DIM TUNE$(CAP),TEMP$(255
):SIZE=0
520 KSG$-"DEFGABCDEFGABCDEFG
ABCDEFGAB"
530 RESTORE 650:FOR A=1 TO 2
7
660 DATA 15,17,19,22,23,26,2
9,31,40,45,47,53,60,64
670 DATA 72,81,91,96,108,121
,128,144,162,182,193,217
805 ?"   SIZE ";SIZE;"/";CAP
3001 ? "OK to write ? ":GET#
1,A:IF A<>89 THEN RETURN
3002 ? CHR$(125)
3580 IF Y=10 OR Y=37 THEN Y-
Y-P
4120 IF Y-11<9 THEN VDT=VDT+
10:OFS=0
4130 IF Y>13 THEN Z=USR(MC,1
5,ND+VDT,SCRN-OFS)
4210 B=Y-9:NTE=ASC(SCALE$(B,
B))
4305 SIZE=T+DUR
6165 SIZE=VAL(TEMP$(15,17)):
SIZE=SIZE*125
7510 TEMP$=KSG$(Y-9,Y-9):P=1
9305 CAP=5000:DIM TUNE$(CAP)
:TAD=ADR(TUNE$)
9355 TRAP 9480:OPEN#2,6,0,FN
$:INPUT#2,TEMP$:SIZE=VAL(TEM
P(15,17)):SIZE=SIZE*125:CLOS
E#2
9390 M=INT(SIZE/256):L=SIZE-
M*256
```

To avoid problems with the highest notes on the top staff being poked into important memory, you will find that they will not be shown but the correct note will be played.

Well that's my part done, Does anyone know how we can introduce polyphony? Any ideas? – **M. Holland, Lower Penn, South Staffordshire.**

Customised screen

I HAVE just typed in the program to customise the default screen from the February issue of Atari User and checked it with Get it Right! The checksum for line 260 didn't match the one published.

After creating an autoboot cassette I attempted to load it by holding down Start and switching the computer on, followed by Return. When the tape stopped the screen had not changed and the computer had locked up.

Can you please tell me what is wrong with the program? – **D. Bill, Rednal, Birmingham.**

● Unfortunately, several bits of data were lost from the end of line 260. The line should read:

```
260 DATA 240,8,201,135,240,4
,201,134,208,31,173,43,2,201
,32,176,24,205,16,7
```

Vintage month

MAY I congratulate you and all your staff for the excellent February issue of Atari User. There was a superb variety of programs and articles which made this edition extraordinarily interesting and informative.

I was intrigued by the technique, exemplified by the Graphic Equaliser program, of reading the digitised values of cassette input.

Even a book I have – Mapping the Atari – never gave me any hint of what the values of the registers signify. So thanks for a superb and fun-to-use program.

I have also been waiting a long time for a music playing program combining an on-screen editor, and getting Melody Maker in the same issue was a real bonus.

May I also congratulate you on your excellent Get it Right! program, which has saved me a lifetime's speculation on what went wrong with my programs.

More of the same, please. – **Richard Martin, Acton, London.**

In the February 1988 issue we published a letter from Martin Osborne of Wimbledon who criticised the lack of software available for Atari users. Here is a selection from the responses we have received over the last few weeks.

Software shortage

WHY is it that 8 bit Atari owners always get left out when games like Out Run are released? I have written to many of the major software companies, but to no avail.

If games like Out Run and

I AM also annoyed about the sad lack of software available for the 8 bit Atari. In my home town of Barrow in Furness there are three computer shops. One doesn't stock any games for the Atari and the other two keep very few and most of them are only £1.99 budget titles.

I am certain plenty of Atari users would buy more games if they were readily available and of a higher quality than a lot of the present ones.

It is quite frustrating that owners of computers like the Commodore and Spectrum have vast numbers of games when those of us with the better machine have to sit out in the cold – **S. White, Barrow in Furness, Cumbria.**

★ ★ ★

I AM in total agreement with Martin Osborne. It seems that all of a sudden software houses have forsaken the 8 bit Atari computers for the new 16 bit ST.

I visit Atari World in Manchester at least once a week and since early December there have only been three or four 8 bit releases. – **L. Griffiths, Boarshaw, Middleton.**

★ ★ ★

AFTER reading the February issue of Atari User I was left

with a question: Every month Gallup provides you with information of games sales which enables you to compile a chart of the top 20 selling Atari games. Could you please tell me which shops are polled by Gallup?

I live in London and yet in such a vast expanse of commercial retailing I still have problems finding Atari software.

I have been informed by its advert that Silica Shop is the UK's No.1 Atari specialist, but although it may have been, since its Tottenham Court Road branch started to sell other formats of computer games its supply of 8 bit Atari software and hardware has dwindled dramatically.

It does appear that even though software houses are producing games for the Atari there are no shops willing to retail them.

With this poor attitude from shops and certain software houses Atari computers are fighting an uphill battle. It would be a crying shame if the popularity of the machine was marred because of ignorance. – **Pierre Chenier, London.**

● The Gallup chart is compiled from sales figures taken from various shops around the country. It may be that when the charts are compiled the shop that you mentioned was not polled.

* * *

A FRIEND told me that there are a lot of good Atari software titles in America that have not been released in England. Is this true, and why aren't they available to people in the UK? – **Glenn Wilkinson, North Preston, Lancashire.**

● There are a lot of games and business programs available in America that haven't been released in the UK. Unfortunately, a lot of UK software distributors believe that the market for 8 bit Atari software is dead, which is a mistake on their part.

We receive an incredible number of letters about this subject and we can see a long life for Atari 8 bit computers in the UK.

* * *

IN November I went to the Atari User Show at the Novotel in London. It was the best show that I have been to and I was pleased to see the amount of interest in Atari products.

Unfortunately there was a lack of new software for the 8 bit Atari and this was a great shame. There were a lot of people there looking for new games for their trusty 8 bits and it was a shame that they had to go away unhappy.

On a lighter theme, I was very pleased to see that Atari is supporting the new XE systems and I send my thanks to Bob Gleadow who has done a great job since he arrived at Atari.

I do hope that it will now release its old cartridge games again at a budget price as I think that they will sell very well.

At the show I saw the new Atari light gun for the XE games system: Will it work on my 130XE computer? – **Jackie O'Malley, Harrogate, North Yorkshire.**

● The new light gun will work on your 130XE, but the only game currently available for it is Bug Hunt on rom cartridge.

In the February 1988 issue of *Atari User* we published a game written to work with the gun, and this listing should show you the techniques needed to incorporate the gun into your own programs.

These are just a few of the letters rolling in highlighting the lack of software for 8 bit users. Perhaps if we moan often and long enough somebody will do something about it.

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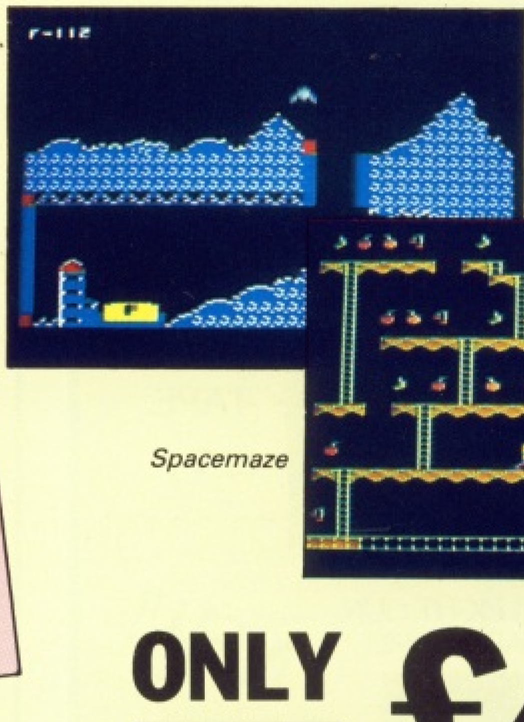
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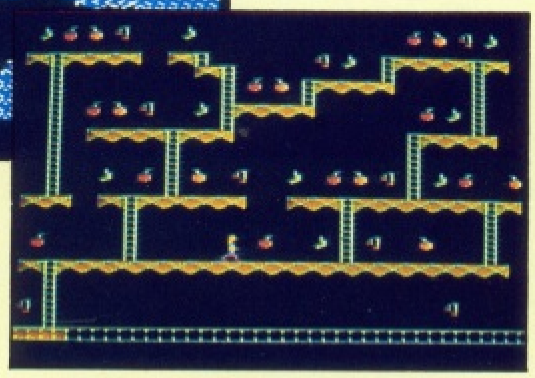
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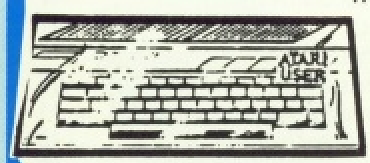
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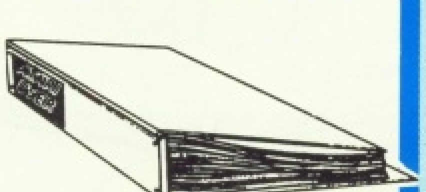
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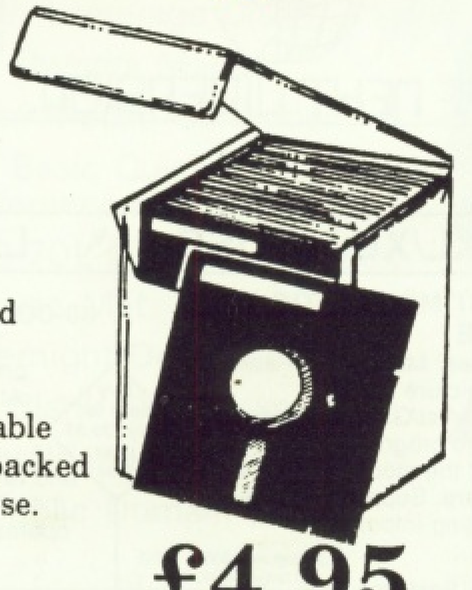


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